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Report on the Effects of Including Dockage and Foreign Material as a Grading Factor for Wheat

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June 1 1989

Honorable E (Kika) de la Garza
Chairman, Committee on Agriculture
House of Representatives
Washington, D.C. 20515

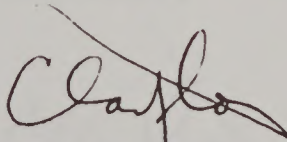
Dear Mr. Chairman:

I am pleased to submit the enclosed report on the effects of including dockage and foreign material as a grading factor for wheat. This study was conducted by the Department of Agriculture's Federal Grain Inspection Service (FGIS) as mandated by P.L. 100-518.

As indicated in the study, combining dockage and foreign material as a grading factor under the Official Standards for Wheat would result in a majority of U.S. wheat grading No. 3 rather than No. 2 unless efforts were made to reduce dockage levels. Although most segments of the wheat industry agree reduced levels of dockage or cleaner wheat is desirable, no consensus exists on how to achieve cleaner wheat or who should pay.

We plan to send this study to the industry-sponsored Grain Quality Workshop for further review and discussion. The workshop membership represents all factions of the wheat industry, including breeders, producers, grain handlers, millers, academia, and the Department of Agriculture.

Sincerely,


Clayton Yeutter
Secretary

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UNITED STATES DEPARTMENT OF AGRICULTURE

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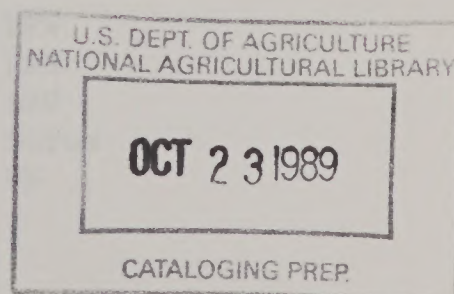
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June 1989

COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES

and



REPORT ON
THE EFFECTS OF INCLUDING
DOCKAGE AND FOREIGN MATERIAL
AS A GRADING FACTOR FOR WHEAT

Submitted by

FEDERAL GRAIN INSPECTION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

To the

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY
UNITED STATES SENATE

and

COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES

June 1983

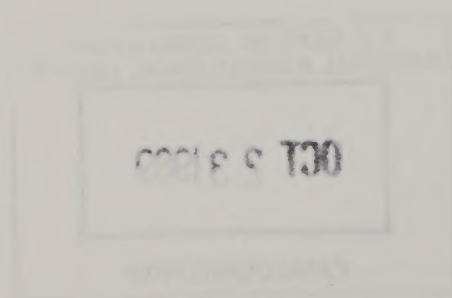


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EXECUTIVE SUMMARY

Section 5 of the United States Grain Standards Act Amendments of 1988 directed the Federal Grain Inspection Service to conduct a study of the effects of including dockage with foreign material as a grading factor for wheat. Additionally, the Federal Grain Inspection Service was required to submit a report on this study not later than June 1, 1989, to the Committee on Agriculture of the House of Representatives and to the Committee on Agriculture, Nutrition, and Forestry of the Senate.

In order to complete the study and report, the Federal Grain Inspection Service requested public comments on the study, determined how dockage is handled, reviewed 3 years of domestic and export inspection data to determine impact, and contracted with the Economic Research Service of the United States Department of Agriculture to assess the economic impact.

Inspection data was used to determine the correlation and ratio of dockage to foreign material as wheat moves through the marketing system from farm to export. The inspection data was also used to simulate the combination of dockage with foreign material to determine what percentage of wheat changes grade using current foreign material grade limits as defined in the Official United States Standards for Wheat. The effects of combining dockage and foreign material as a nongrading factor was also evaluated.

The results of this analysis indicate:

1. Wheat generally contains less foreign material than dockage.
2. A majority of U.S. wheat contains foreign material within the U.S. No. 1 grade limit.
3. Dockage levels are more uniform at the export market than at the domestic market.
4. The proportion of dockage to foreign material is lower at the export market when compared to the domestic market.
5. Shifts in numerical grade designations occur (better quality becomes lower quality) at the domestic and export markets when dockage and foreign material are combined as a grading factor.
6. Shifts in numerical grade designations occur (lower quality becomes better quality) at the domestic and export markets when dockage and foreign material are combined as a nongrading factor.

The Economic Research Service determined the economic impacts of combining dockage and foreign material as a single factor using several pricing options. The pricing options included (1) combining dockage with foreign material as a grading factor, (2) combining dockage with foreign material as a deductible by weight, and (3) combining dockage with foreign material as a nongrade deductible with a discount for foreign material. The cost of cleaning was also evaluated as part of the economic impact analysis.

The economic impact analysis indicates:

1. The economic impact for combining dockage with foreign material as a grading factor would range between \$18.7 and \$19.9 million.
2. The economic impact for combining dockage with foreign material as a deductible by weight would range between \$5.4 and \$10.9 million.
3. The economic impact for combining dockage with foreign material as a nongrade deductible with a discount for foreign material would range between \$20.9 and \$22.3 million.
4. The economic impact for cleaning wheat would range between \$23.4 and \$26.7 million; however, between \$2 and \$3 million in costs could be recovered by selling the cleanings as a feed ingredient.

Comments received on the study to combine dockage with foreign material indicate the wheat industry supports efforts to market cleaner wheat; however, a consensus of opinion does not exist with respect to achieving this goal. Further, there is no agreement on whether the cost of achieving cleaner wheat would be offset by making U.S. wheat more competitive and helping prevent market erosion.

INTRODUCTION

Congressional concerns about dockage levels in wheat resulted in a mandatory study of combining dockage with foreign material. Specifically, Section 5 of the United States Grain Standards Act Amendments of 1988 (Public Law No. 100-518) states that:

"Not later than June 1, 1989, the Secretary of Agriculture, through the Federal Grain Inspection Service, shall-

"(1) conduct a study of the effects of including dockage with foreign material as a grading factor for wheat; and

"(2) submit a report on the results of such a study to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate."

To complete the study, the Federal Grain Inspection Service (FGIS) (1) published a notice in the December 5, 1988, Federal Register (53 FR 48948) requesting public comments on the study; (2) corresponded with State grain and feed associations to learn how dockage is handled; (3) analyzed data, representing 3 years of export and domestic inspections, to recalculate grades and determine impact; and (4) contracted with the Economic Research Service (ERS) of USDA to conduct an economic impact study.

OFFICIAL U.S. STANDARDS FOR WHEAT

The Official U.S. Standards for Wheat facilitate trade by providing measurements of the physical and biological condition of the wheat. Testing methods must be timely, simple, repeatable, and cost effective in order to meet the needs of the grain market.

The official standards identify wholesomeness through Sample grade and Special grade designations. The official standards use physical quality characteristics of wheat as the basis for numerical grades. Maximum limits are established for each numerical grade on factors such as shrunken and broken kernels, foreign material (FM), damaged kernels, and defects. Minimum limits are established for test weight per bushel. Physical conditions, such as dockage and moisture, are nongrade determining factors that are reported when a grade is determined.

Official U.S. Standards for Wheat

		Minimum limits of--		Maximum limits of--					
				Damaged Kernels					
		Test weight per bushel						Wheat of other classes 4/	
Grade	Hard Red	All other	Heat	Foreign	Shrunken:Defects 3/	Contrasting	Total 5/		
	Spring	classes	damaged	material	and	broken	classes		
	wheat or	and	kernels	Total 2/	broken	classes			
	White Club	subclasses			kernels				
	wheat 1/								
	(pounds)	(pounds)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
U.S. No. 1	58.0	60.0	0.2	2.0	0.5	3.0	3.0	1.0	3.0
U.S. No. 2	57.0	58.0	0.2	4.0	1.0	5.0	5.0	2.0	5.0
U.S. No. 3	55.0	56.0	0.5	7.0	2.0	8.0	8.0	3.0	10.0
U.S. No. 4	53.0	54.0	1.0	10.0	3.0	12.0	12.0	10.0	10.0
U.S. No. 5	50.0	51.0	3.0	15.0	5.0	20.0	20.0	10.0	10.0

U.S. Sample grade:

U.S. Sample grade is wheat that:

- Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, 4, or 5; or
- Contains 32 or more insect-damaged kernels per 100 grams of wheat; or
- Contains 8 or more stones or any number of stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more castor beans (*Ricinus communis* L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), 2 or more rodent pellets, bird droppings, or equivalent quantity of other animal filth per 1,000 grams of wheat; or
- Has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor); or
- Is heating or otherwise of distinctly low quality.

1/ These requirements also apply when Hard Red Spring or White Club wheat predominate in a sample of Mixed wheat.

2/ Includes heat-damaged kernels.

3/ Defects include damaged kernels (total), foreign material, and shrunken and broken kernels. The sum of these three factors may not exceed the limit for defects for each numerical grade.

4/ Unclassed wheat of any grade may contain not more than 10.0 percent of wheat of other classes.

5/ Includes contrasting classes.

Wheat dockage is defined as:

"All matter other than wheat that can be removed from the original sample by use of an approved device according to procedures prescribed in FGIS instructions. Also, underdeveloped, shriveled, and small pieces of wheat kernels removed in properly separating the material other than wheat and that cannot be recovered by properly rescreening or recleaning."

For many years, wheat dockage was reported in whole or half percentage points with any fraction of a half percentage disregarded. In May 1987, the official standards were revised requiring that wheat dockage be reported to the nearest tenth of a percent.

Wheat FM is defined as:

"All matter other than wheat that remains in the sample after the removal of dockage and shrunken and broken kernels."

FM generally consists of material exhibiting the same size, shape, and density characteristics of wheat kernels. This material is not readily removed from wheat as dockage. FM is also a component of the grading factor "defects."

Wheat defects are defined as:

"Damaged kernels, foreign material, and shrunken and broken kernels. The sum of these three factors may not exceed the limit for the factor defects for each numerical grade."

The factor "defects" describes wheat value by identifying quality deficiencies that have an adverse affect on flour extraction, flour color, and baking performance.

GOVERNMENT FACTORS INFLUENCING WHEAT CLEANLINESS

1. Grain Quality Improvement Act of 1986. Public perceptions of grain quality problems prompted legislation to improve U.S. grain quality in 1986. This legislation, the Grain Quality Improvement Act of 1986 (GQIA), (Public Law No. 99-641), amended the U.S. Grain Standards Act and refined the objectives of the grain standards. The law states that it is declared to be the policy of Congress that the Official U.S. Standards for Grain shall:

- a. Define uniform and acceptable descriptive terms to facilitate trade in grain,
- b. Provide information to aid in determining grain storability,
- c. Offer users of such standards the best possible information from which to determine end-product yield and quality of grain, and
- d. Provide the framework necessary for markets to establish grain quality improvement incentives.

The GQIA also prohibited the recombining or addition of dockage and FM to grain. Regulations implementing this prohibition were effective June 30, 1987, for all locations except export facilities where the prohibition was effective January 1, 1988. These changes may result in less nonwheat material in wheat.

2. Premiums and Discounts. The Agricultural Stabilization and Conservation Service (ASCS) is required by Congress to determine how premiums and discounts could be used to encourage the production, marketing, and exporting of high quality, clean grain. ASCS often acquires large volumes of wheat through loan defaults, so a system of premiums and discounts for FM and dockage may rapidly alter harvesting and cleaning practices by producers. ASCS directly influences the market through its loan programs, and the proposed premiums and discounts may stimulate the delivery of cleaner grain.

3. Grain Standards. Since enactment of the GQIA, improvements have been made in determining and reporting the cleanliness of wheat. Dockage is now reported in tenths of a percent and the number of insect-damaged kernels is a Sample grade criterium. These positive changes take time to affect the massive U.S. marketing system. Preliminary data is insufficient to evaluate any quality changes. While the change to report dockage to the nearest tenth of a percent may appear straightforward, the change generated great debate throughout the wheat industry. Wheat producers, elevator operators, domestic millers, merchandisers, exporters, and overseas buyers continue to adjust to the reporting change.

4. Inspection Procedures. FGIS recently proposed improvements to the Shiplot Inspection Plan. The proposed changes in shiploading do not directly reduce the amount of nonwheat material in a cargo, but an improved shiploading plan will more rapidly identify inferior quality grain. Improvements to the Shiplot Inspection Plan may benefit buyers who specify maximum dockage limits in their contracts.

CLEANING AND MARKETING PRACTICES

1. General. The term "dockage" is used differently by some members of the U.S. wheat industry. This varying use of terminology creates some misunderstanding within the marketing structure. Discounts assessed against grain for high moisture, damaged kernels, or excessive FM are frequently referred to as "price dockage." The seller was "docked" or "discounted" a certain monetary value from the base price. This terminology is, at times, confused with the official factor "dockage" as defined in the U.S. Wheat standards. The definition of dockage is dependent on a set of procedures using a specific laboratory sieving and aspirating device known as a Carter Day dockage tester.

In the international market, the term "dockage" also causes occasional confusion due to the difficulty in translating the term into other languages and correlating it to standards or terms used by other nations. Other nations use terms, such as screenings, clean out, offal, impurities, Besatz, and unmillable, to describe the wheat and nonwheat material removed prior to flour milling. These terms are defined using different sieve sizes and methods of removing the unwanted materials.

Although some confusion may occasionally arise over the meaning of dockage, both the domestic and export wheat markets do specify quality requirements that include dockage. The export contract specifications provided later in this report clearly illustrate the sophistication of the overseas buyers and their ability to specify specific quality needs using the current standards.

2. Domestic Practices. Agronomic and harvesting techniques greatly influence the levels of dockage found in wheat. Producers, faced with an unusual weed problem or unfavorable harvesting conditions, will likely experience higher levels of dockage. An FGIS survey of the 1988 wheat crop shows a 0.0 to 22.9 percent range of dockage in U.S. wheat being officially inspected. Producers typically do not have on-farm cleaning capability. They rely on harvesting equipment and techniques to reduce the amount of impurities in wheat.

Nonwheat material not removed from wheat during harvest will enter the marketing system upon receipt at the grain elevator. Elevator managers will accommodate their suppliers (producers) by accepting a wide range of dockage. In some regions, elevators accept wheat with dockage up to 1 percent without deducting the dockage from the gross weight nor discounting the wheat. For example, some elevators in Kansas absorb the cost of dockage and do not deduct the weight so long as the dockage levels are near average for the season. Some elevators deduct all the dockage from the gross weight. In North Dakota, some elevators report deducting the weight of the dockage and discounting for wheat with dockage in excess of 1 percent. Elevators will reject wheat deliveries when the dockage is "excessive," but each elevator sets its own limits on what is excessive.

Due to a lack of information on the wheat cleaning capacity of grain elevators, FGIS surveyed State grain and feed associations regarding this issue. Many individuals surveyed indicated there was increased interest in cleaning wheat. This is possibly due to changes in the standards and prohibitions mandated by the GQIA. Although an interest in cleaning wheat exists, many grain facilities do not have adequate equipment for large scale cleaning.

The survey of grain and feed associations indicated only minimum cleaning capability in Oregon, Washington, and Idaho. The States of Montana, Kansas, and Nebraska have a moderate level of cleaning capability and rely on some mobile cleaning companies. In Minnesota, the interest in cleaning wheat has risen to the point that some regional cooperative elevators are adding cleaners. North Dakota is an exception. Many elevators in North Dakota have and typically use cleaning equipment.

The difference in the regional capability to clean wheat is influenced by agronomic, harvesting, transportation, and marketing practices. Producers can minimize impurities, such as chaff, straw, and weed seeds, by modifying harvesting techniques. Grain handlers can remove such impurities through the use of various cleaning devices. However, in either case, the producer and grain handler must consider the impact of cleaning wheat. Producers must consider environmental conditions, available resources for harvesting, and crop condition when deciding on the most effective harvesting procedures. Weather constraints and crop condition may prohibit taking the necessary measures for optimum wheat cleaning during harvest. Elevator managers are faced with similar decisions. Is there a market for clean wheat? Will transportation savings, the value of wheat cleanings, and improved storability of cleaned wheat offset the costs associated with cleaning wheat? As evident by the diverse cleaning capability from one region to another, the factors influencing cleaning differ across the country.

Historically, in the Hard Red Spring (HRS) wheat producing States, wheat was cut and allowed to dry before being picked up and thrashed. Because of this practice, many elevators have cleaning equipment and commonly clean HRS wheat. The direct competition with Canadian spring wheat may also serve as an incentive for U.S. elevators to clean spring wheat. Further savings on transportation costs may influence cleaning of HRS wheat.

In recent months, some domestic end users of spring wheat have tightened contract terms for nonwheat material. This has also encouraged further wheat cleaning.

As indicated by the survey, there is minimum cleaning capability in the Hard Red Winter (HRW) wheat production areas. These areas typically have lower average levels of dockage making it less essential that an elevator clean wheat to fulfill loadout quality specifications. A review of 1986-88 domestic inspection results shows an average HRW wheat dockage level of 0.73 percent. This is only slightly higher than the normal export contract specification of 0.5 percent dockage nondeductible. Consequently, through blending and minimum cleaning at inland or export terminals, the grain industry can meet export HRW wheat quality requirements.

3. Export Practices. Export elevators typically establish maximum dockage limits for wheat movements into the facility in order to fulfill export contract requirements. Shipments received containing dockage in excess of the maximum limits may be accepted provided the wheat can be cleaned or conditioned to meet export requirements. Export elevators are very cautious when receiving shipments with excessive dockage levels because few facilities are equipped to remove wheat dockage.

The standard marketing practice at export elevators is to deduct dockage from the gross weight of the inbound movement. The elevator may also apply discounts for dockage exceeding a maximum amount specified by the facility.

Export contracts often contain specific requirements for dockage. Typically, but not always, dockage is deducted from the gross weight of the export shipment. The amount of dockage deducted may also differ. Many contracts do not assess a deduction until the level of dockage exceeds 0.5 percent. Further, some contracts specify a maximum dockage limit which may, if exceeded, result in a discount in addition to the weight deduction.

Exporters with wheat containing high levels of dockage might negotiate a lower sale price with importers by not deducting the weight of dockage. Because of budget constraints and intended uses of the wheat, an importer might have reasons to accept the lower price along with no deductions for dockage.

The following list illustrates actual examples of specifications used in export contracts by foreign buyers.

"No specifications, no weight deductions."

"0.5 percent dockage nondeductible; no maximum limit on the amount."

"0.5 percent dockage nondeductible; 1.0 percent maximum limit on the amount."

"0.5 percent dockage nondeductible; either 0.5 or 0.8 percent maximum limit on the amount."

"0.1 percent dockage nondeductible; excess dockage all deductible."

"All dockage deductible, no maximum."

"All dockage deductible, 1.0 percent maximum limit on the amount."

"All dockage deductible, either 0.5 or 0.8 percent maximum of the amount."

"Zero dockage allowed, all dockage in shipment is deducted; penalty imposed for any dockage found at rate of 1 to 1 ratio of percent dockage to percent of contract price."

These specifications illustrate options in negotiations between buyers and sellers. Many factors influence buyer specifications, such as cleaning capabilities, price of nonwheat material, proximity to feed users, ocean freight charges, import duties on grain, flour specifications, and domestic prices of wheat with varying percentages of dockage.

Importer interest in specifying terms for dockage is increasing with more buyers looking at options to minimize dockage in their wheat shipments. Many importers are still adjusting their contracts due to reporting dockage in tenths of a percent. Specifying terms for dockage in the export contract may increase the price of wheat but it also ensures the buyer of receiving a more acceptable quality for a specific end use.

For example, Taiwan has adopted tighter dockage specifications. In 1985, Taiwan shipments averaged 1.02, 0.75, and 0.94 percent dockage for HRS, HRW, and White (WW) wheats, respectively. After adopting tighter requirements, the 1988 shipment averages were 0.62, 0.36, and 0.47 percent for the same classes.

FGIS monitors and responds to foreign complaints on wheat exports. During the fiscal years 1984 through 1988, 12,067 wheat lots were inspected for export. In that time, 30 lots or 0.2 percent involved complaints about dockage and FM. Of these 30 lots, 16 were for excessive dockage and 14 were for excessive FM.

4. Foreign Practices. The Office of Technology Assessment (OTA) of the Congress of the United States recently published a study of the quality of U.S. grain in world markets. Included in the study was a comparison of the wheat industries of major U.S. competitors. For illustrations, a comparison of the cleaning practices of major competitors of the United States is included in table 1. Generally, wheat cleaning is not common at the farm level in the countries. Contract terms, government set prices, and premiums and discounts are the reasons cited for cleaning wheat.

Table 1

Cleaning Practices of Foreign Competitors

<u>Country</u>	<u>Target Limits</u> ^{1/}	<u>U.S. Factor Equivalent</u>	<u>Incentive</u>
Argentina	≤ 0.75% FM	Dockage and FM	Mandatory Inspection, Premiums, Discounts
Australia ^{2/}	≤ 7.0% Unmill- able Material	Dockage and FM	Contracts, Standards, Mandatory Inspection
Canada #1 Spring Wheat	≤ 0.40% FM	Dockage, FM, and Broken Kernels	Export Standards
France	≤ 2.0% Impure	Dockage and Defects	Contracts

^{1/} Represents limit for primary export quality.

^{2/} Australia allows "nil" stones, sticks, and sand.

A brief review of the OTA findings by country is useful.

Argentina In Argentina, FM is anything other than wheat that passes through a slotted sieve (1.6 by 9.5 millimeter holes) and all material other than wheat remaining on the sieve. Wheat with excessive FM is discounted to the seller. The government requires that all wheat in commercial channels meet quality standards imposed by the government. This results in wheat being cleaned and dried as close to the production point as feasible. Because of the marketing system and limited number of grades, blending of wheat is less common than in the United States.

Exporters do not clean all grain to zero impurities or broken kernels but just below the No. 1 limit. The Argentine grain handling system is equipped to clean to lower levels if there are sufficient economic incentives to exceed the minimum quality permitted under the grade.

Australia The Australians have minimum receival standards, variety control, and marketing controls for wheat. All wheat is inspected and an official grade determined at the point of first sale. The tight unmillable material standards provide producers an incentive to harvest clean wheat. Producers typically use double screens in their combines to clean grain during harvest. Wheat which does not conform to basic specifications is cleaned and resubmitted for receival or sold

as General Purpose or Feed wheat. A load of wheat must meet the receival standards to enter the marketing system. The price spread is wide between graded wheat and General Purpose or Feed wheat so that growers have an incentive to hold unmillable material to a minimum level.

Canada

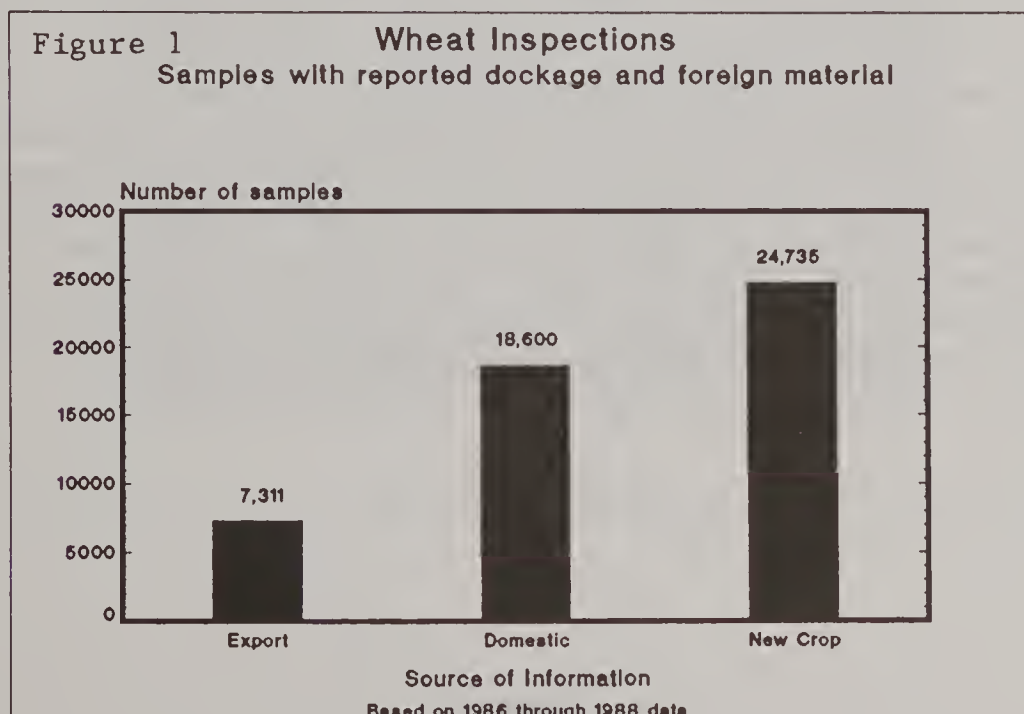
All wheat shipped out of the terminal elevators must be commercially cleaned to export standards and essentially free of dockage. A majority of the cleaning of Canadian prairie wheat takes place at the terminals, with limited cleaning conducted on the farm or at primary elevators. Normally, the wheat is cleaned before going into storage. The Canadians permit wheat blending at primary points in the marketing system; but, at export terminal elevators, blending is closely regulated.

France

In general, wheat is cleaned, dried, and treated for insects at the first receiving grain elevator. Wheat leaving the farms is relatively free of impurities because of good weed control and proper combine adjustment. Producers are paid net of the screenings and this no doubt reinforces the good farming practices. The term "impurities" includes broken kernels, other cereal grains, sprouted kernels, and FM which is similar to dockage and total defects in the U.S. system. Contracts typically specify a maximum of 2 percent impurities.

MARKET SAMPLE REVIEW

1. Sets of Data. FGIS recalculated the grades assigned to market samples to evaluate the effects of alternative methods for reporting dockage and FM. The data summarized represents three distinct sets of information from export shipments, domestic movements, and new crop samples. Special grades or conditions that might have been assigned to samples based on condition factors were ignored for grade recalculations. The three sets of data are summarized in figure 1.



New Crop Wheat Samples. This data has been collected for 3 years. The data represents randomly selected new crop samples selected during the first month following the start of local harvest throughout the country. Samples representing factor only inspections and those without both dockage and FM measurements were omitted from this study before the samples were regraded. There were 24,735 samples suitable for comparison to the other sets of data. The new crop data was collected following the 1986, 1987, and 1988 crop harvests.

Domestic Movement. Randomly selected original inspections are routinely inspected a second time for supervision purposes. The results are stored in FGIS' Grain Inspection Monitoring System. Samples without adequate factor measurements for recalculation were deleted from this study, as were supervision results of export sublots and appeal samples. This created a data set of domestic movement sample inspection results for comparison to the export and new crop data sets. This set of domestic inspections contained 18,600 supervision samples representing domestic movements from October 1985 through November 1988. The recalculated grades were based on supervision results, which were reported to the nearest tenth of a percent, rather than original dockage results which were often reported to half and whole percentages prior to May 1987.

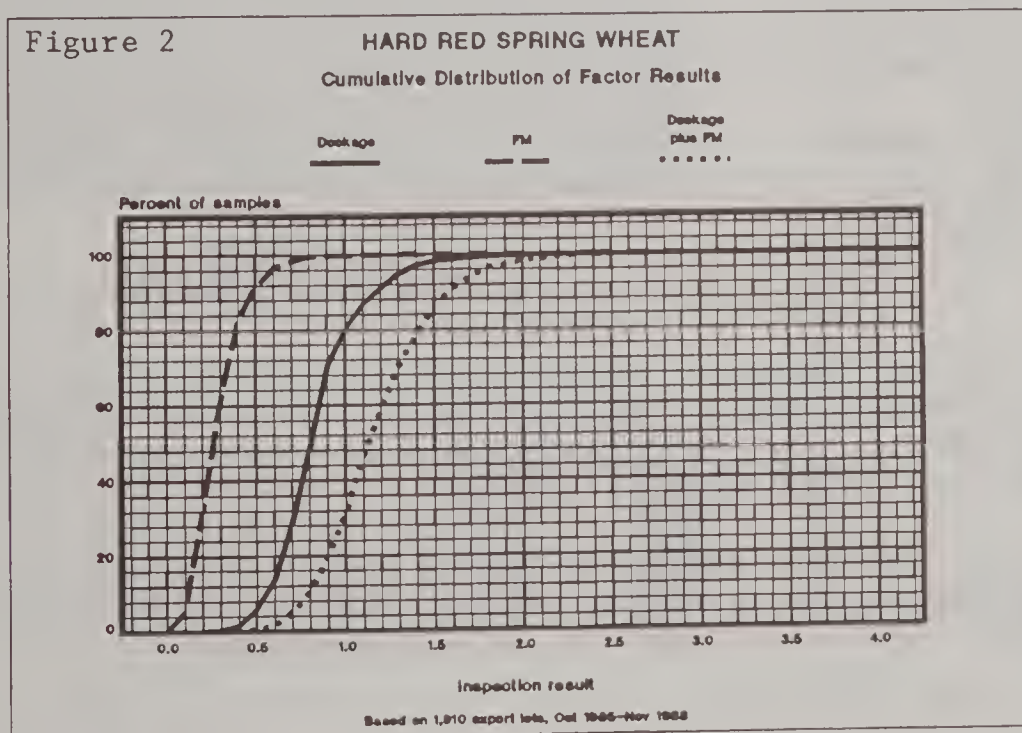
Export Shipments. The average quality of every export grain shipment is maintained in FGIS' Export Grain Information System. Some lots are actually better in quality than the certificated numerical grade due to the certification option available for export cargo. The certification option permits a certificated numerical grade as "U.S. No. 2 or better;" however, the actual factor results may be within the numerical limits for a U.S. No. 1 grade designation. For the purposes of this study, export shiplot factor results were reviewed to determine the actual numerical grade quality. Thus, some lots were considered as a better grade when the certification option was disregarded. Export quality data used in the study represented 7,311 shiplots loaded from October 1985 through November 1988.

In each set of data, five classes were reviewed: Durum, HRS, HRW, Soft Red Winter (SRW), and WW. Using the three sets of data, individual samples were recalculated by two methods. Method one, the dockage was added to FM as a grade determining factor; and method two, the FM was added to the dockage as a nongrade determining factor. Adding dockage to FM potentially affects the grade by increasing total FM and by increasing total defects. Conversely, adding FM to dockage as a nongrade determining factor means FM no longer has a grade limit and FM no longer is part of total defects. Eliminating FM from total defects increases the combined total amount of damaged kernels and shrunken and broken kernels permitted within a grade limit. With dockage as part of the grading factor, more nonwheat material is included as wheat for pricing purposes. With FM as part of a nongrading factor, less nonwheat material is included as wheat for pricing purposes. The recalculations used the current grade limits for FM and total defects.

2. Differences in Sets of Data. The three sets of data were used to evaluate potential grading system changes on different segments of the market. As anticipated, differences exist in factor results for FM and dockage between export and domestic data. Dockage and FM measurements become more uniform in export shipments.

Local wheat deliveries with excessive amounts of dockage, moisture, and FM are cleaned and conditioned to make grade or diverted to animal feed if the wheat cannot be reconditioned. Blending and conditioning continues as wheat moves through the marketing chain so that a grade factor which may have downgraded a wheat shipment can be brought within grade or contract limits for export. Although dockage is not a grading factor under the grain standards, the marketplace establishes dockage limits as necessary to fulfill domestic and export quality demands. Dockage limits are often specified in export contracts and market incentives are established to meet such contract specifications. Thus, the factor results for FM and dockage in export data are statistically more uniform than in domestic data. Durum is an exception with little difference in the data between export and domestic data. Durum is often exported as U.S. No. 3 for which the tolerances are greater than for U.S. No. 2.

3. Frequency Distribution. Frequency distribution graphs in appendixes A through E show the cumulative percentage of all results in each set of data that contain a given level of a factor or less. The frequency distributions represent actual values from the export lots, domestic movements, and new crop wheat sets of data. Each graph provides three curves, one for FM, one for dockage, and one for the combined FM and dockage value. The frequency distributions illustrate how changes in the factor grade limits affect the percentage of samples within each grade limit.



Examples of the graphs are illustrated in figures 2, 3, and 4 using all the sample data for HRS wheat. Reviewing the figures, export lots show FM was within the 0.5 percent factor limit for the U.S. No. 1 grade in 90 percent of the HRS wheat samples. Likewise, in domestic movement data, FM levels were at or less than the 0.5 percent factor limit in 87 percent of the HRS wheat samples. Similar relationships between dockage and FM exist for the other wheat classes as illustrated by the graphs provided in appendixes A through E.

FM is a smaller value than dockage in the three sets of data. Several reasons explain this. Agronomic and harvest conditions seldom result in large amounts of FM in wheat. The percentage of FM is well within the grade limit in most wheat moving in the marketing system so there is little need to blend off large amounts of FM. Looking at specific export data for HRS wheat, the average dockage value is 2.7 times larger than the FM average.

In the domestic data for HRS wheat, the average dockage value is 4.4 times larger than the FM average; and for new crop wheat, the dockage average is 5.4 times larger than FM. As illustrated by this data, dockage, not FM, makes up the major portion of nonwheat material.

Table 2 reflects the ratios of dockage to FM averages by class and by each set of data. The information is similar to that shown in the frequency distribution graphs. The ratios refer to the arithmetic mean.

Figure 3

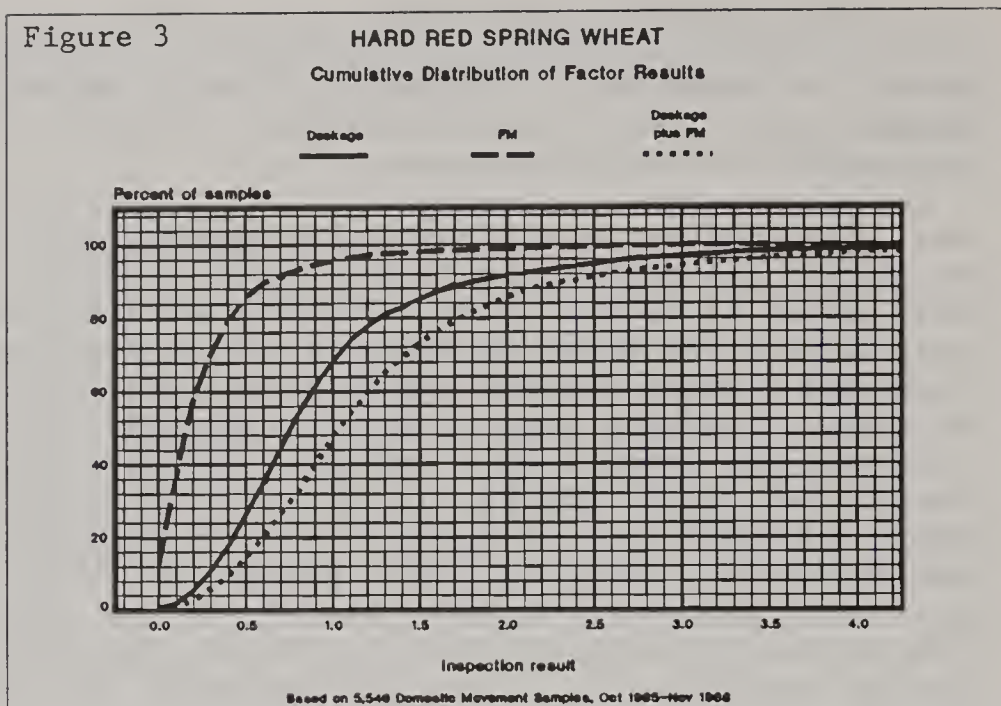


Figure 4

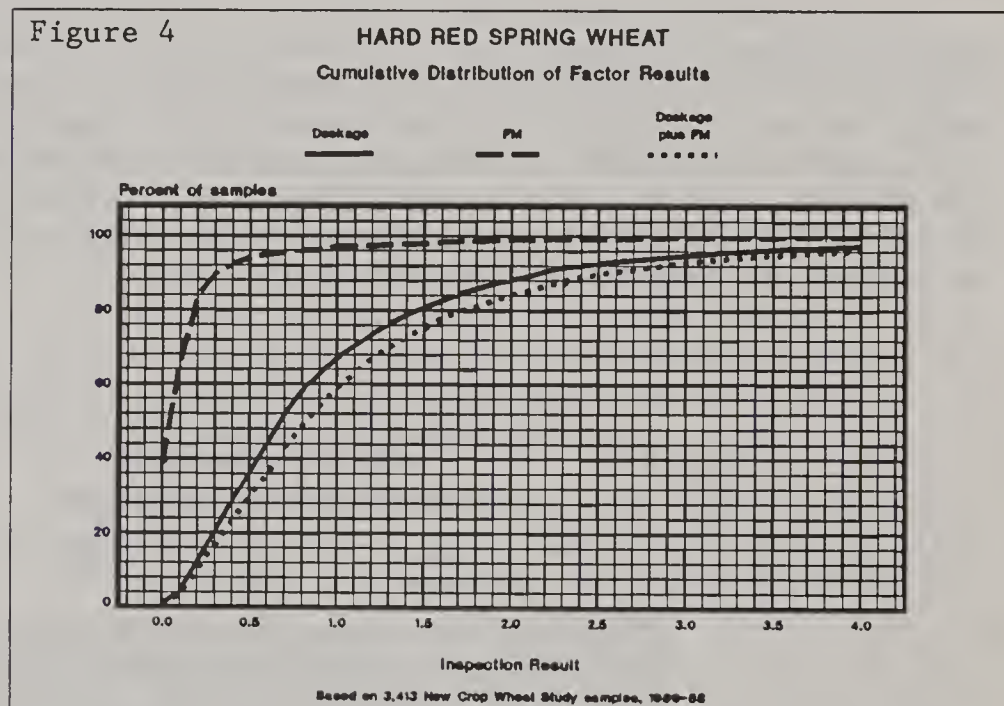


Table 2

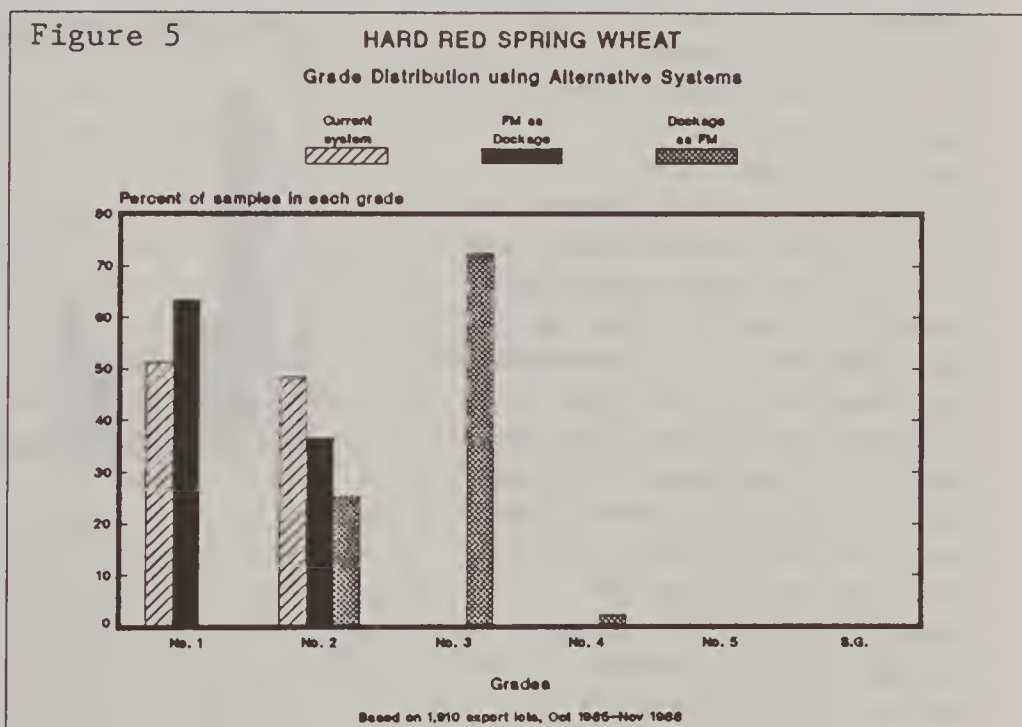
Ratio of Dockage to FM Averages

	New Crop Wheat			Domestic Movement			Export Lots		
	<u>Dockage</u>	<u>FM</u>	<u>Ratio</u>	<u>Dockage</u>	<u>FM</u>	<u>Ratio</u>	<u>Dockage</u>	<u>FM</u>	<u>Ratio</u>
WW	0.88	0.13	6.77	1.00	0.32	3.13	0.66	0.25	2.64
Durum	1.34	0.34	3.94	1.08	0.40	2.70	0.98	0.55	1.78
SRW	0.95	0.19	5.00	0.82	0.18	4.56	0.82	0.24	3.42
HRW	0.95	0.30	3.17	0.73	0.38	1.92	0.64	0.30	2.13
HRS	1.08	0.19	5.68	1.01	0.31	3.26	0.88	0.33	2.67

The information presented in table 2 also illustrates that the average level of dockage appears to decrease as wheat moves from the farm to the export market, and the average level of FM increases. This may occur as a result of combining different qualities of wheat to fulfill the primary export grade level of U.S. No. 2 wheat. Any cleaning that may occur during this process will likely remove dockage but not FM. Cleaning FM from wheat is much more difficult, requiring special cleaning efforts.

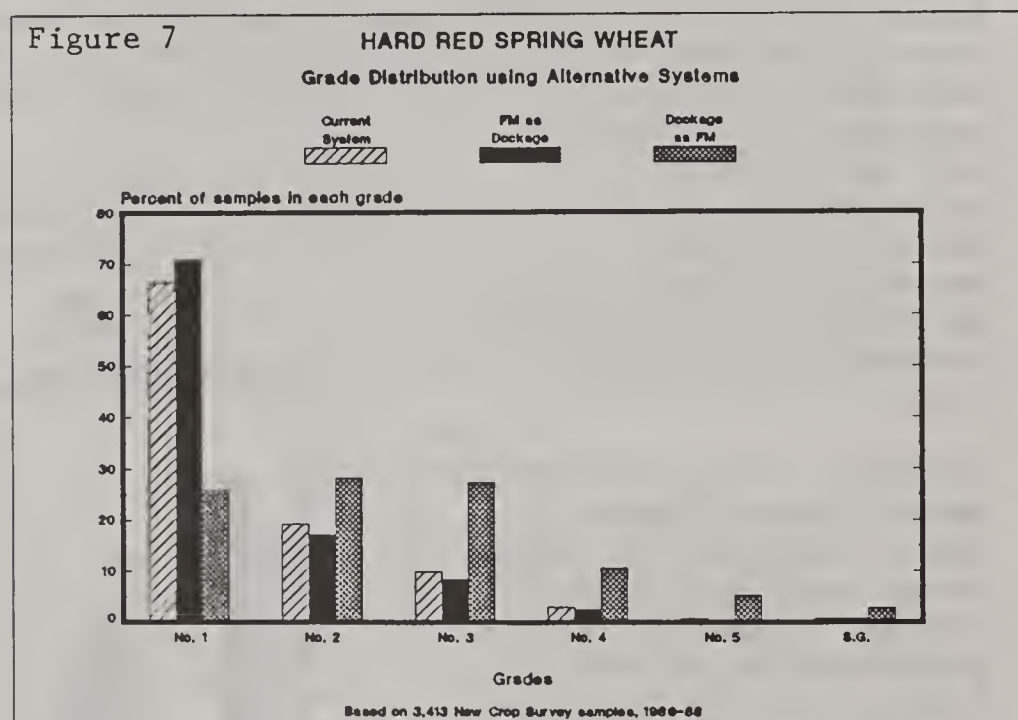
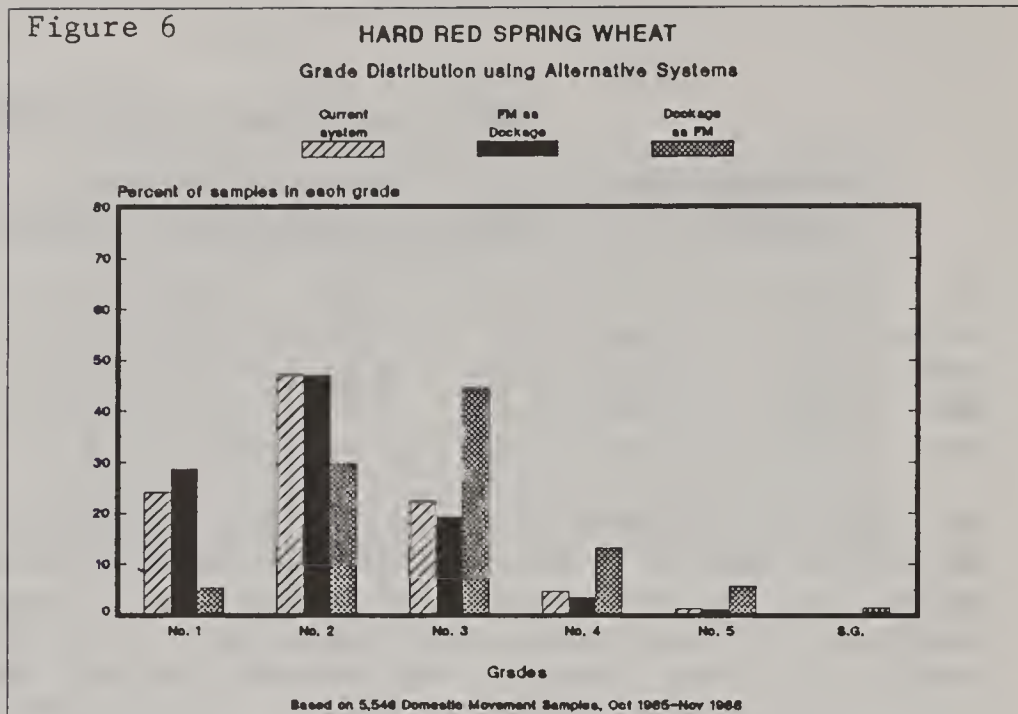
4. Recalculation of Grades. The bar charts as shown in figures 5, 6, and 7 illustrate the grading impact if the current method of reporting dockage and FM is changed. Without changing the current grading limits for FM, the effect of combining dockage with FM as a grading factor and as a nongrading factor is shown. The market would experience severe effects if FM and dockage were combined as grading factors. For all sets of data analyzed, many wheat shipments would be a lower grade than under the current standards. Combining FM with dockage as a nongrading factor would result in a large percentage of the samples qualifying as higher grades compared to the current system.

The export (figure 5) and domestic data (figures 6 and 7) show that the grades change dramatically when dockage is added to FM as a grade determining factor. Looking at the export lots for HRS wheat (figure 5), none of the lots would grade U.S. No. 1, only 24 percent would grade U.S. No. 2, and 73 percent of the lots would grade U.S. No. 3.



In the domestic movement data for HRS wheat (figure 6) only 5 percent would grade U.S. No. 1, 30 percent would grade U.S. No. 2, and the lots graded U.S. No. 3 would rise to 45 percent.

The downward shift in grades seen in HRS wheat holds true for the other classes of wheat. Combining dockage and FM as a grading factor under the current wheat standards would result in a significant portion of U.S. wheat grading No. 3 unless steps were taken to reduce the level of dockage in wheat. Having a large amount of the wheat grading U.S. No. 3 could result in more No. 3 wheat being traded. Buyers, more concerned with price than the amount of nonwheat material, may decide No. 3 wheat better meets their needs. If this occurs, the grain market will target shipments to the U.S. No. 3 FM limit of 2 percent rather than the current market standard of 1 percent. This would represent a disincentive to clean wheat considering the current average combined level of dockage and FM is approximately 1.1 percent. Furthermore, combining dockage and FM as a grading factor, regardless of the level, will mean the buyer will pay wheat prices for the dockage which is deducted from the gross weight under current marketing practices.



ERS ECONOMIC RESULTS

1. General. ERS reviewed export data provided by FGIS for the years 1984 through 1988. Importers are more likely to be concerned about dockage in wheat than domestic millers. Importers often discount wheat prices for the dockage or deduct the weight of the dockage, in which case payments are based on actual wheat quantity. However, they incur costs of freight, possible excise taxes on weight of the shipment, wheat cleaning, and disposal of the screenings. Importers normally pay wheat prices for FM because FM is part of the grade and FM is normally a small percentage of total defects. If dockage is added to FM as a grading factor, importers may pay wheat prices for more nonwheat material. ERS identified several pricing options: (1) with dockage included in FM as a grading factor, (2) with FM included in dockage as a deductible by weight, and (3) with FM included in dockage as a discount. ERS' study identified wheat cleaning as another option.

U.S. No. 2 meeting the grade limit of 1.0 percent for FM is the most commonly traded wheat. For purposes of the study, ERS defined the combination of dockage and FM as the new grading factor (NGF). The sum of dockage and FM as a grading factor would cause a significant amount of wheat to fall below U.S. No. 2 simply on the basis of the NGF and not considering other grade limit factors. For example, in the years 1984 through 1988, at least 70 percent of the Durum and SRW classes would have been graded as U.S. No. 3 or lower.

Half or more of the shiplots of HRS, HRW, and WW wheat classes would still grade U.S. No. 2 or better (50, 65, and 69 percent, respectively) by enforcing the NGF. These calculations are based on the assumption that the grade limit of 1.0 percent for FM would remain the same for the NGF.

The ERS analysis was limited to the effects on wheat value based on wheat pricing categories and concepts. Other economic criteria, such as transportation costs, equipment purchase costs, equipment maintenance costs, operational costs, and producer harvesting costs were not evaluated due to time constraints and available resources.

2. Impact as a Grading Factor. The economic impact was calculated with dockage added to FM as a grade factor. To determine the costs of NGF as a grade factor, price differentials for the winter of 1988/89 were used and the average discount from U.S. No. 2 to U.S. No. 3 ranged from 0.02 cent to 0.06 cent per bushel. The lowest discounts applied to HRW wheat and the highest discounts applied to Durum wheat. Based on these average discounts, the income lost due to shiplots being regraded as U.S. No. 3 in 1984/85 would have totaled \$18.71 million. The same discounts applied to shiplots regraded in 1987/88 as U.S. No. 3 would have caused income loss of \$19.93 million.

3. Impact as a Discount Factor. Another option is to treat NGF as a nongrade deductible with a discount for FM. The most common factor discounts used by representative grain trading firms were used to evaluate costs. In some cases, the FM factor discount schedules were greater than the price differentials used between U.S. No. 2 and U.S. No. 3 grade. For HRW, HRS, and Durum wheats, the factor discounts begin at 0.5 percent even though the factor grade limit for U.S. No. 2 is 1.0 percent. The loss of income by

applying the factor discount on the NGF in 1984/85 was \$20.85 million. In 1987/88, the loss of income was \$22.27 million. The class of wheat hit most heavily by this factor discount would have been HRW wheat because more HRW wheat is exported than any other class and the discount schedule starts at 0.5 percent.

4. Impact as a Deductible Factor. Another alternative is to treat the NGF as a nongrade deductible by weight rather than using the current discount schedule. For these calculations, amounts of NGF under 1.0 percent were not penalized and the NGF material above 1.0 percent was deducted from the total weight of the shiplots. The weight of the NGF deducted was valued at the export market prices for each class of U.S. No. 2 wheat. In all classes, the loss of income of the deducted nonwheat material in 1984/85 would have been \$10.86 million but only \$5.39 million in 1987/88. This method shows the least loss of income among the options reviewed. However, the discount by weight method does not penalize NGF until the amount is above 1.0 percent, and it is doubtful that importers would accept NGF as a deductible if penalties were not assessed on all the nonwheat material.

5. Impact by Cleaning. Producers could alleviate the loss of income by cleaning the wheat. Cleaning costs are estimated at 0.03 cent per bushel, but a more important cost is the loss of nonwheat material which currently sells at wheat prices. In the worst case scenario, nonwheat material has no resale value and income losses would have been \$26.75 million in 1984/85 and \$23.42 million in 1987/88. However, in the likely event that nonwheat material has value as animal feed, the income losses would have been \$24.17 million in 1984/85 and \$21.45 million in 1987/88. These costs were based on cleaning wheat down to 1.0 percent of NGF. The producer or local elevator would gain potential premiums for higher quality wheat and save on transportation.

6. Summary of Costs. Discounting practices and price differentials would adjust to reflect the new grading environment and grain blending would continue. During the past 4 years, costs of the possible changes would have ranged from \$10.86 million to \$26.75 million in 1984/85 and \$5.39 million to \$23.42 million in 1987/88. These costs are not as high as they appear when compared to total export value.

In fiscal year 1985, the export value of wheat was \$4.26 billion; and, in fiscal year 1988, the export value of wheat was \$4.47 billion. Thus, the costs of NGF represent approximately 0.1 to 0.6 percent of total export value at any time from 1984 through 1988. On a per-bushel basis, costs of the possible changes would have ranged from 0.8 cent to 1.9 cents for 1984/85 and from 0.3 cent to 1.5 cents for 1987/88.

RESULTS OF COMMENTS

FGIS requested public comments on the study in the Federal Register with a comment period of December 5, 1988, to February 5, 1989. The information provided by the commenters indicated the issue is significant, with widely differing responses from domestic and overseas commenters. FGIS received 63 responses before the close of the comment period and 3 after closing. Of the 63 comments, 30 favored combining dockage and FM into one grading factor.

Twenty-three commenters opposed any changes to dockage and FM. The 10 remaining commenters supported the study but took no position. Of the 31 overseas responses, 26 favored the combination. Of the 32 domestic responses, only 4 favored the combination. The 63 commenters did not have a consensus on this issue. If anything, the comments dramatize the nearly opposite points of view between the domestic wheat industry and overseas buyers.

1. Overseas Comments. The overseas commenters favor reducing the level of nonwheat material in wheat to levels similar to Canadian and Australian export wheat. They stated that dockage and FM are physically treated the same in the flour milling process. That is, flour mills remove nonwheat material as much as possible before milling. Although importers typically do not pay for dockage as wheat because it is deducted from the weight of the shipment, they do pay freight, import taxes or duties, and cleaning costs. These costs vary among importers, but the point was made clearly that dockage costs importers more than it is worth as mill feed. Several commenters suggested making dockage a grading factor and setting tight grade limits for it. A number of commenters encouraged FGIS to find a simpler, mechanical method to measure gross cleanout so that retests by importers will be more consistent with original inspection results. Finally, commenters noted that the emphasis should be to reduce the content of nonwheat material rather than revising the names to describe the material.

2. Domestic Comments. Domestic commenters noted that dockage is removed before determining test weight so it cannot be combined with FM unless the procedures for test weight are also changed. Many commenters mentioned the lack of cleaning equipment and the costs to producers to clean wheat or take discounts if dockage is combined with FM. Commenters expressed concern that the combination would not result in cleaner wheat but simply downgrade the crop with more wheat trading at the U.S. No. 3 grade level. Commenters stated that FM is difficult to remove so it should be reported separately from dockage, thus providing buyers more information than if dockage and FM are a single grade factor. Commenters felt it was too soon to know the effects of reporting dockage in tenths of a percent, and no action was justified until the change in reporting is known. Since the change to reporting in tenths of a percent, more importers are specifying dockage terms in their contracts. In response to reporting dockage in tenths of a percent, some elevators discount dockage at levels greater than 1 percent. Commenters stated that the domestic wheat market functions well with respect to dockage and FM, so no change is justified.

CONCLUSIONS

The terminology used to describe nonwheat material varies among nations. Terms, such as screenings, foreign material, impurities, Besatz, and unmillable, are used to describe nonwheat material. Many of these terms are composed of subcategories further describing the composition of the nonwheat or nonmillable material. While combining dockage and FM into one grading factor under the Official U.S. Standards for Wheat may eliminate confusion regarding the distinction of each component, it will not standardize terminology used in the international wheat market to describe nonwheat material. Measuring the amount of nonwheat material and describing the composition in terms relative to end users is more important than the name given to the material (e.g., screenings, foreign material, impurities, and nonmillable).

Combining dockage and FM into one grading factor under the existing Official U.S. Standards for Wheat will result in a significant portion of U.S. wheat grading No. 3 rather than No. 2 unless producers and grain handlers reduce dockage levels. However, evidence does not exist to indicate that combining dockage and FM as a grading factor will serve as an incentive to reduce the amount of dockage and FM in U.S. wheat. Market reaction would determine whether such a change serves as a quality improvement incentive.

All members of the wheat industry, from producer to exporter, must determine whether it is feasible and practical to clean wheat. Producers must consider environmental conditions, equipment capability, crop condition, and other factors when deciding optimum harvesting procedures. The producers ability to remove impurities during harvest may be hampered by one or more of these factors. Grain handlers must also consider various factors when deciding whether to clean wheat. In brief, the cost of cleaning must be offset by transportation savings, the value of wheat cleanings, improved storability, and a higher market price for clean wheat.

While the wheat industry in general supports efforts to market cleaner wheat, no consensus exists on how to achieve cleaner wheat or who should pay. Further, there is no agreement on whether the cost of achieving cleaner wheat would be offset by making U.S. wheat more competitive and helping prevent market erosion.

In May 1987, FGIS changed the reporting of dockage to tenths of a percent to provide more accurate information to buyers. This action was well received by importers and is providing the marketplace with the necessary information to better assess the value of wheat and the feasibility of cleaning wheat. Those segments of the domestic and export markets that desire lower levels of dockage have instituted pricing schedules and contract requirements to achieve their objective. The current Official U.S. Standards for Wheat provide the necessary information for the buyer and seller to apply price schedules and fulfill contract requirements.

Other factors influencing wheat dockage and FM levels include: the GQIA prohibitions on adding dockage and FM to grain, the ASCS study of premiums and discounts for dockage and FM, the reforms of the Shiplot Inspection Plan, increased interest by foreign buyers to specify specific dockage requirements in the export contract, and the future effects of the Canada/U.S. free trade agreement if cleaned Canadian wheat moves into the U.S. domestic market.

The recent OTA study entitled "Enhancing the Quality of U.S. Grain for International Trade" concluded, in part, that improving the quality of U.S. grain is a complicated issue involving the interrelationship and complexity of plant varieties, agronomics, environment, handling practices, end-use preferences, marketing, and government policies. Modifying the Official U.S. Standards for Grain alone will not improve grain quality. This holds true for combining dockage and FM into a grading factor for the purpose of improving wheat quality. The current standards provide sufficient information regarding impurities in wheat. The marketplace, based on various factors, must decide whether to use this information to reduce the level of impurities.

APPENDIX A - E

Page

Appendix A - Hard Red Winter Wheat

Frequency Distribution - New Crop	A-1
Grade Chart - New Crop	A-2
Frequency Distribution - Domestic	A-3
Grade Chart - Domestic	A-4
Frequency Distribution - Export	A-5
Grade Chart - Export	A-6

Appendix B - Hard Red Spring Wheat

Frequency Distribution - New Crop	B-1
Grade Chart - New Crop	B-2
Frequency Distribution - Domestic	B-3
Grade Chart - Domestic	B-4
Frequency Distribution - Export	B-5
Grade Chart - Export	B-6

Appendix C - Soft Red Winter Wheat

Frequency Distribution - New Crop	C-1
Grade Chart - New Crop	C-2
Frequency Distribution - Domestic	C-3
Grade Chart - Domestic	C-4
Frequency Distribution - Export	C-5
Grade Chart - Export	C-6

Appendix D - Durum Wheat

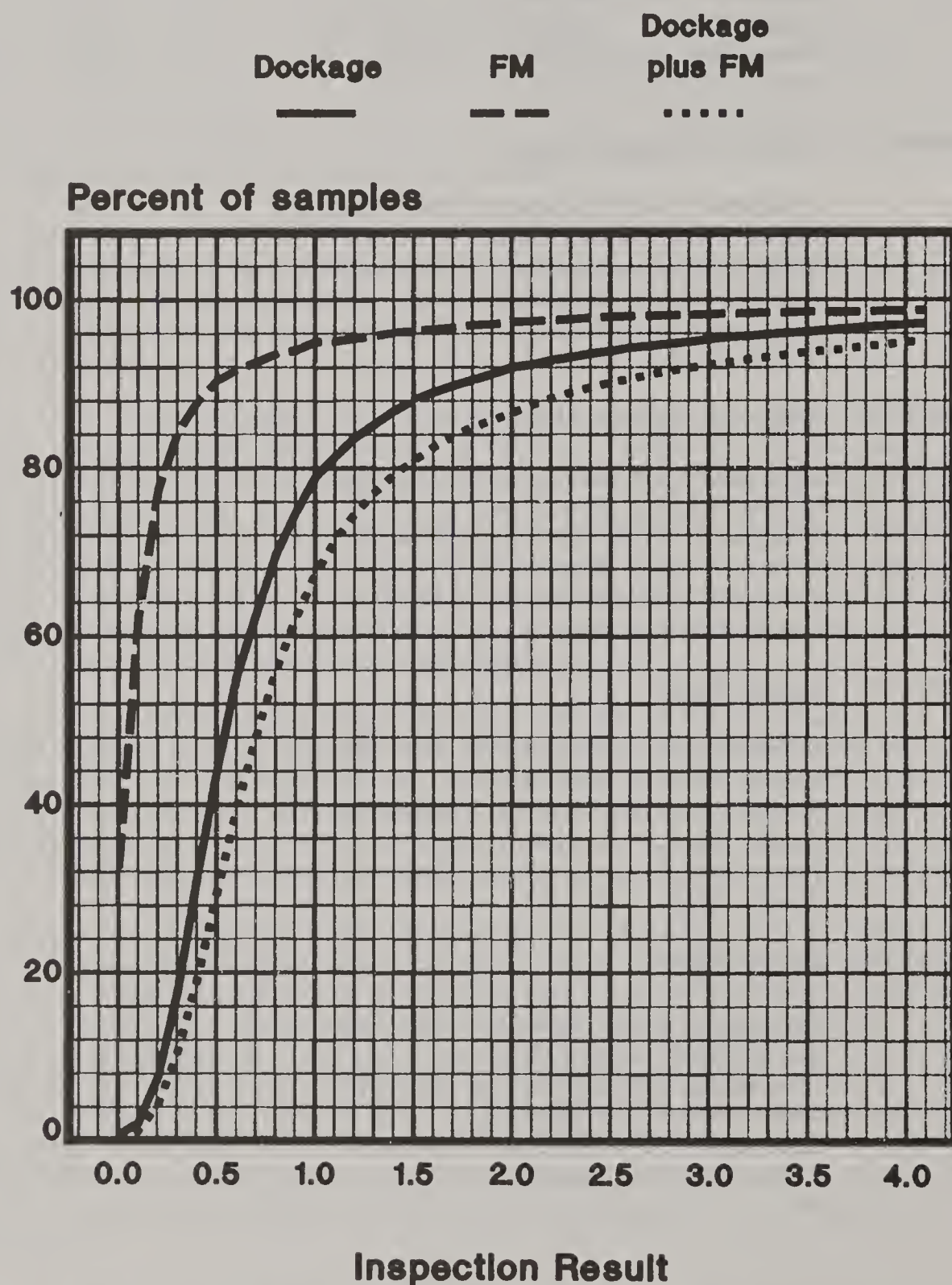
Frequency Distribution - New Crop	D-1
Grade Chart - New Crop	D-2
Frequency Distribution - Domestic	D-3
Grade Chart - Domestic	D-4
Frequency Distribution - Export	D-5
Grade Chart - Export	D-6

Appendix E - White Wheat

Frequency Distribution - New Crop	E-1
Grade Chart - New Crop	E-2
Frequency Distribution - Domestic	E-3
Grade Chart - Domestic	E-4
Frequency Distribution - Export	E-5
Grade Chart - Export	E-6

HARD RED WINTER WHEAT

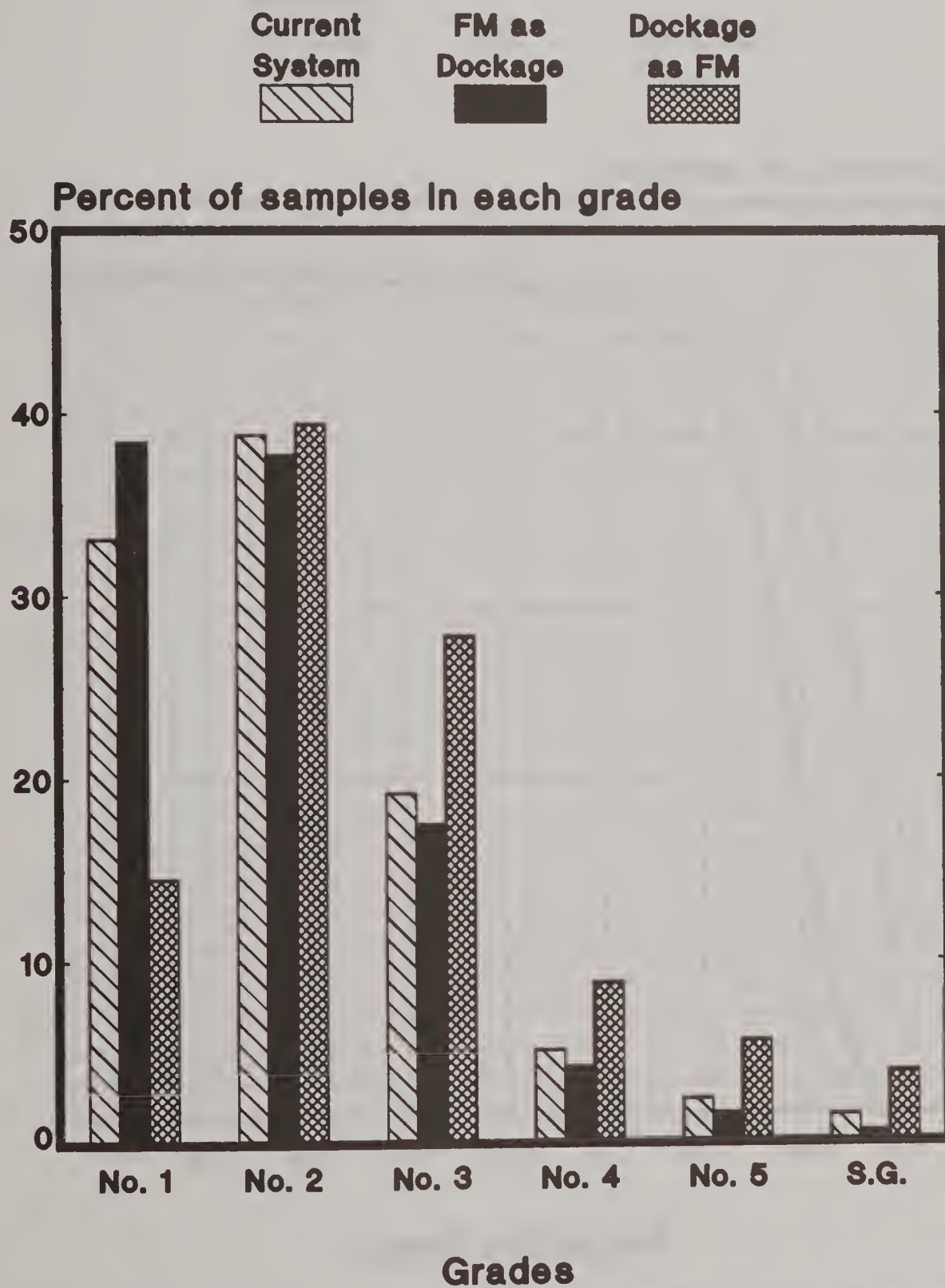
Cumulative Distribution of Factor Results



Based on 10,699 New Crop Wheat Study samples, 1986-88

HARD RED WINTER WHEAT

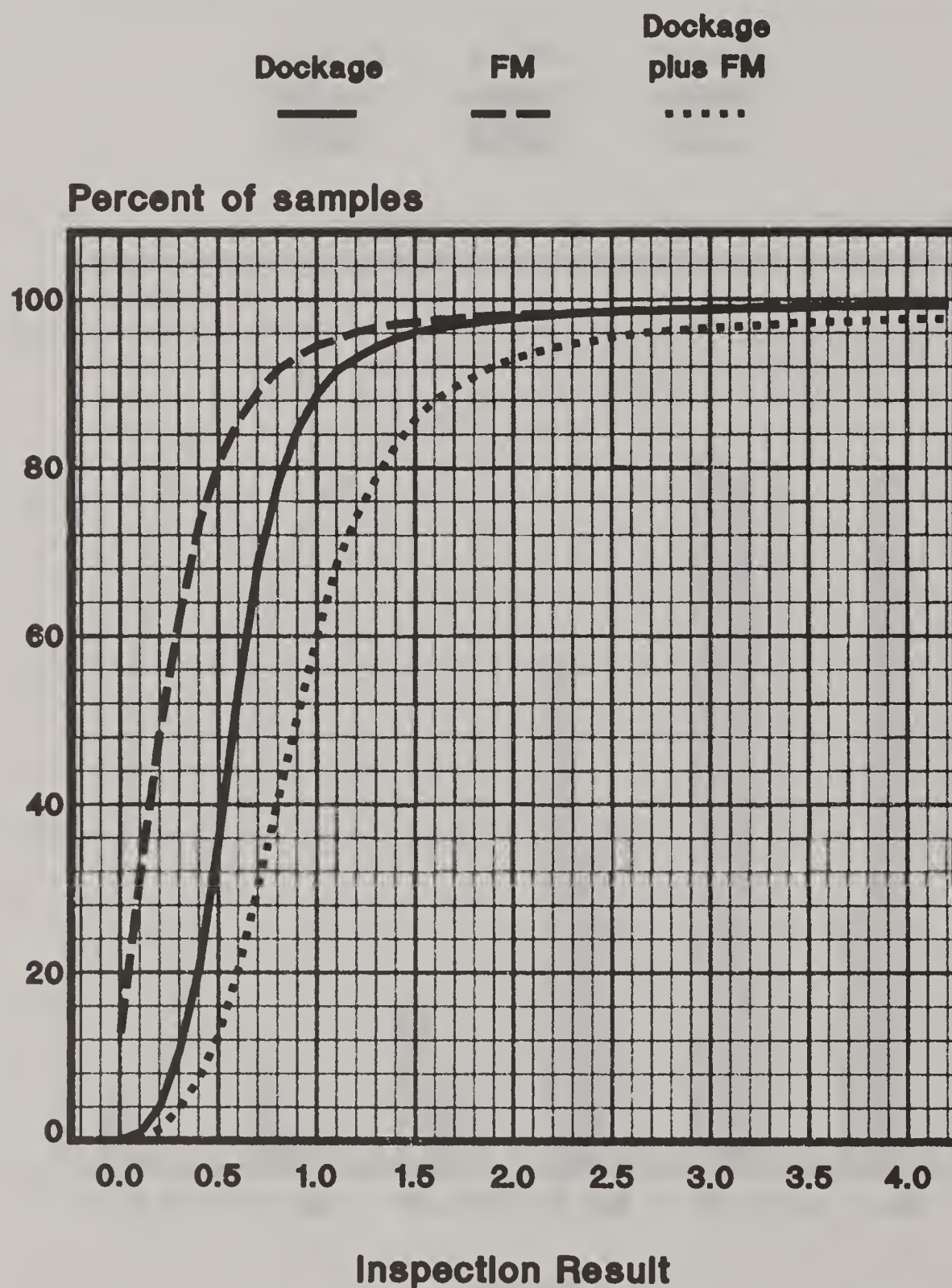
Grade Distribution using Alternative Systems



Based on 10,699 New Crop Survey samples, 1986-88

HARD RED WINTER WHEAT

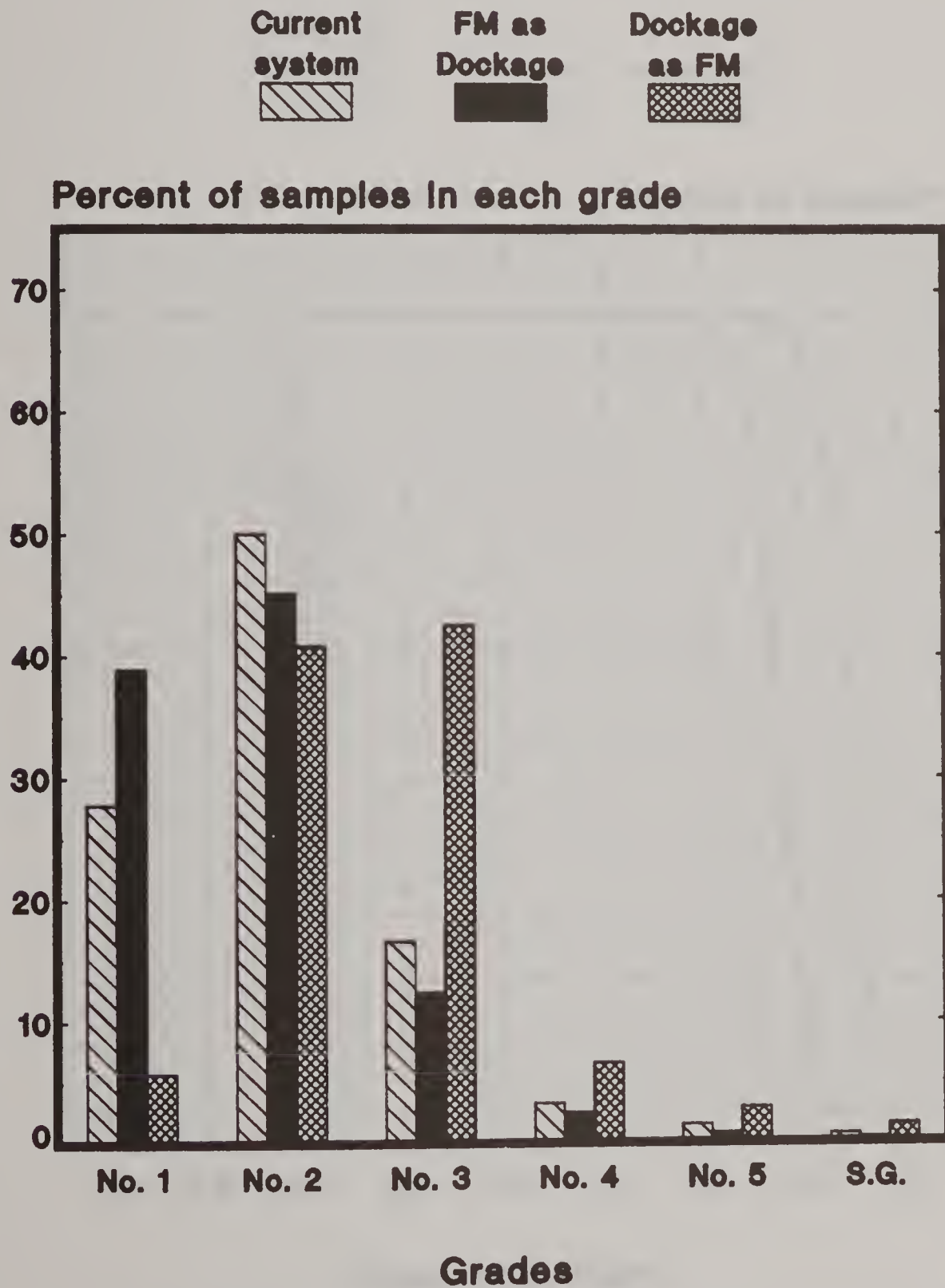
Cumulative Distribution of Factor Results



Based on 9,099 Domestic Movement Samples, Oct 1985–Nov 1988

HARD RED WINTER WHEAT

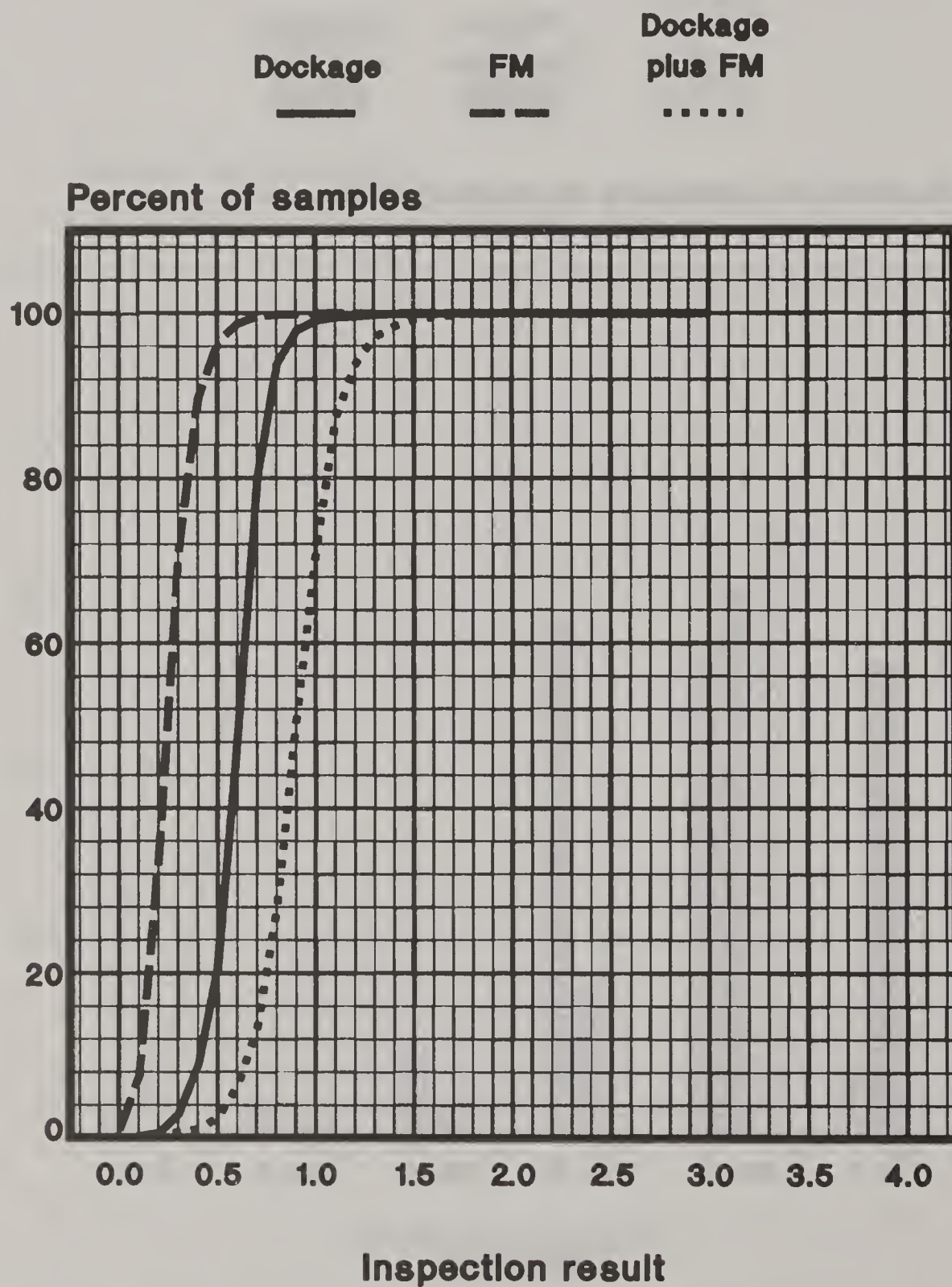
Grade Distribution using Alternative Systems



Based on 9,099 Domestic Movement samples Oct 1985–Nov 1988

HARD RED WINTER WHEAT

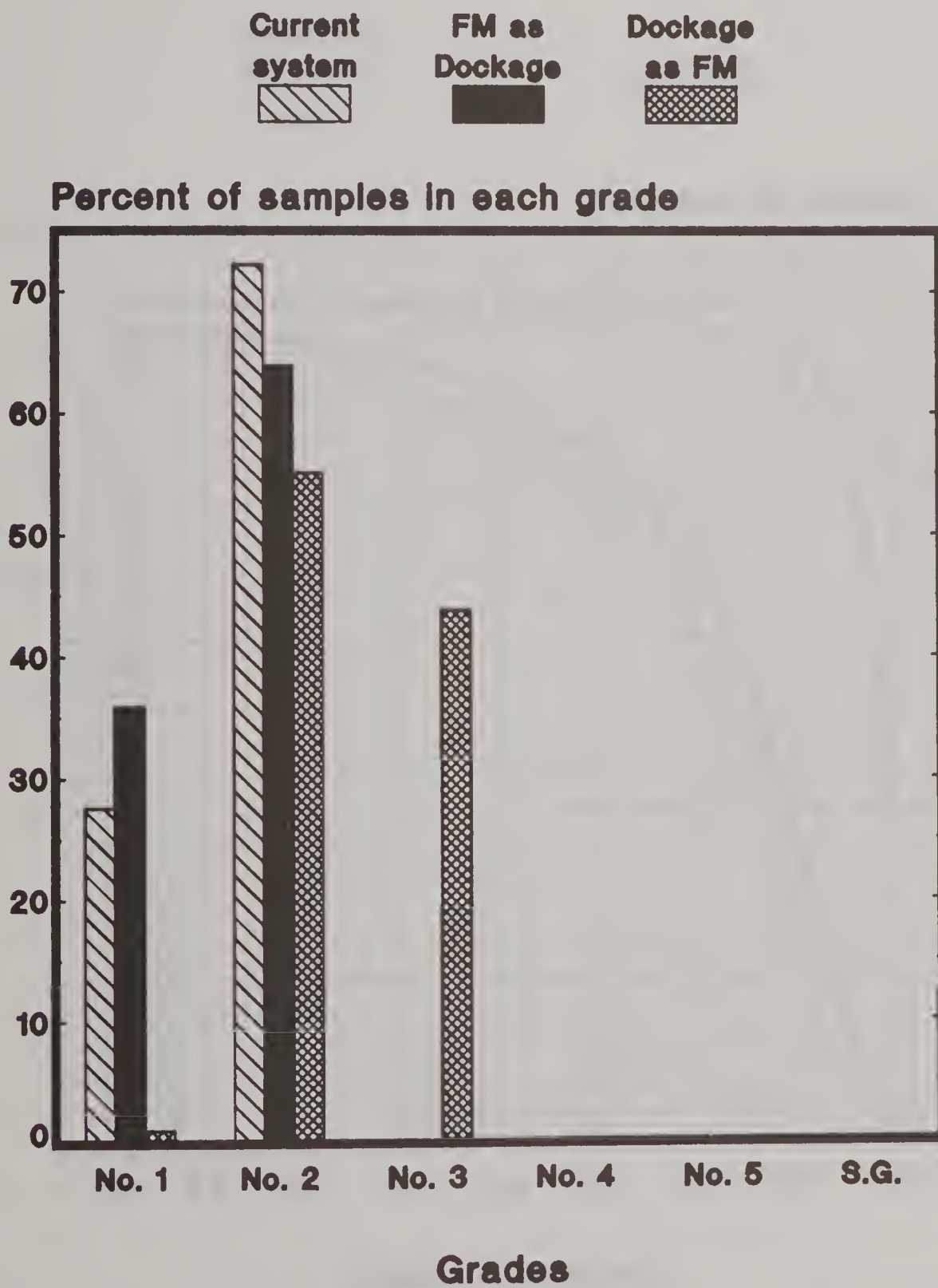
Cumulative Distribution of Factor Results



Based on 2,604 export lots, Oct 1985–Nov 1988

HARD RED WINTER WHEAT

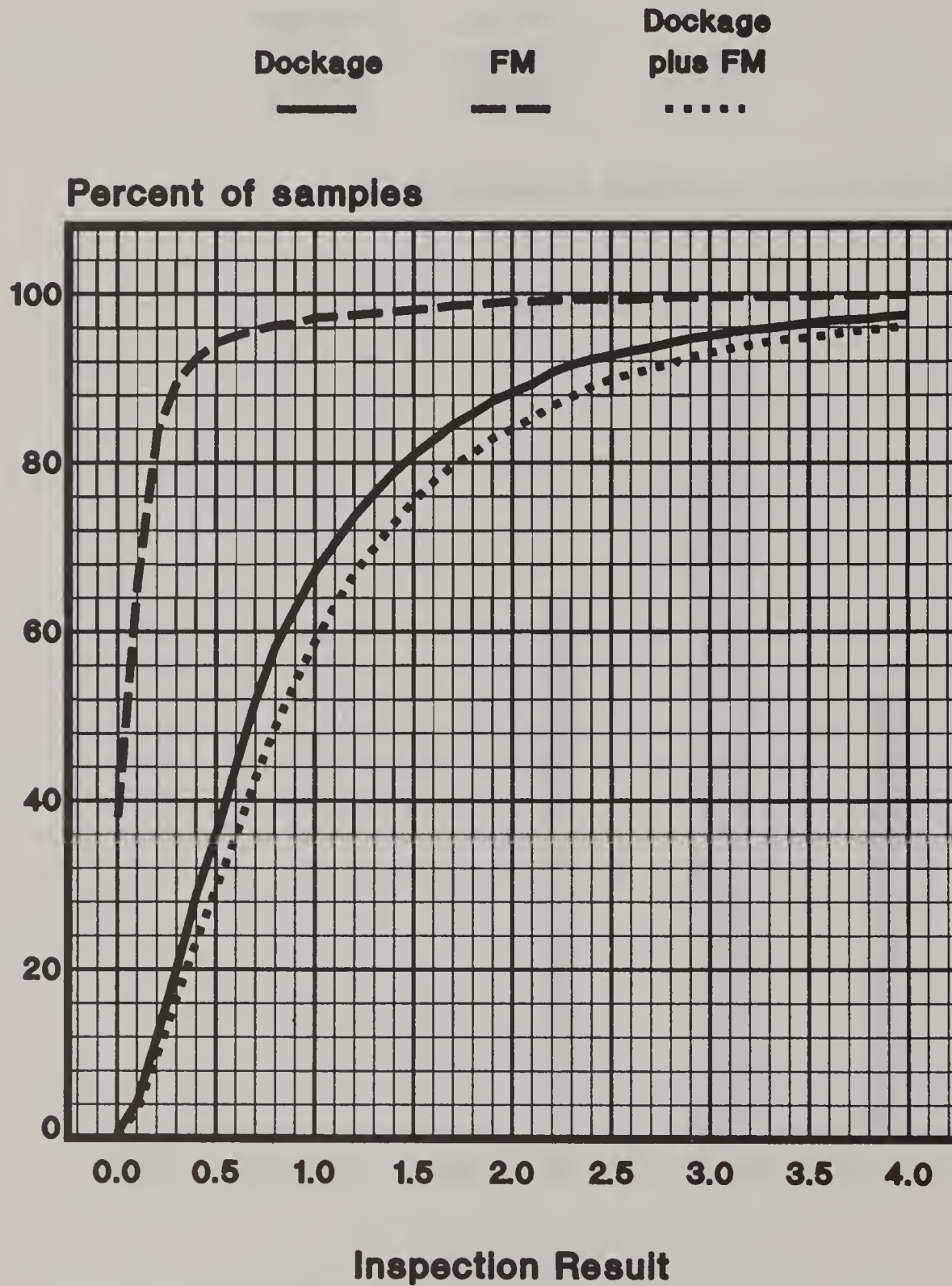
Grade Distribution using Alternative Systems



Based on 2,604 export lots, Oct 1985–Nov 1988

HARD RED SPRING WHEAT

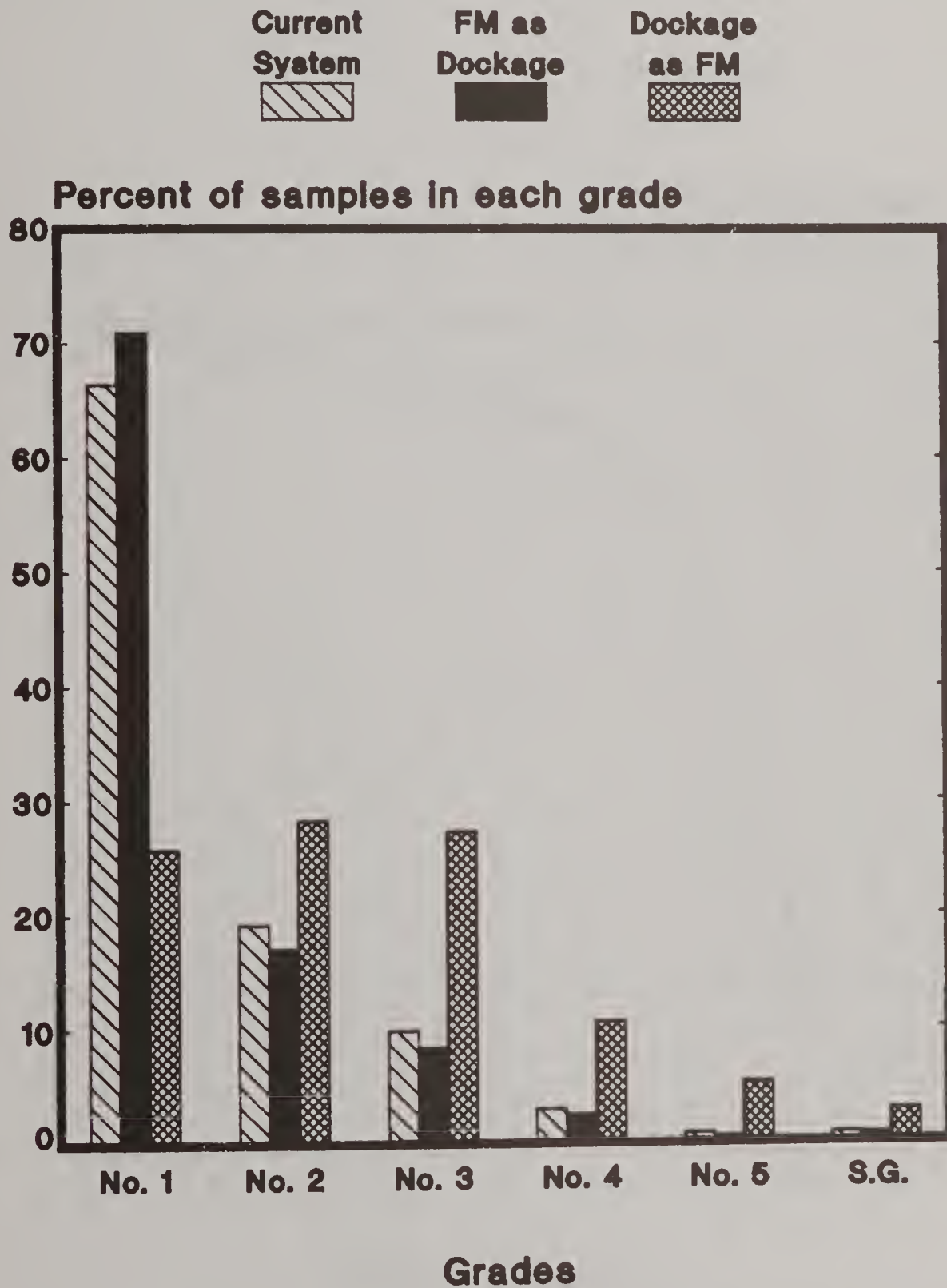
Cumulative Distribution of Factor Results



Based on 3,413 New Crop Wheat Study samples, 1986-88

HARD RED SPRING WHEAT

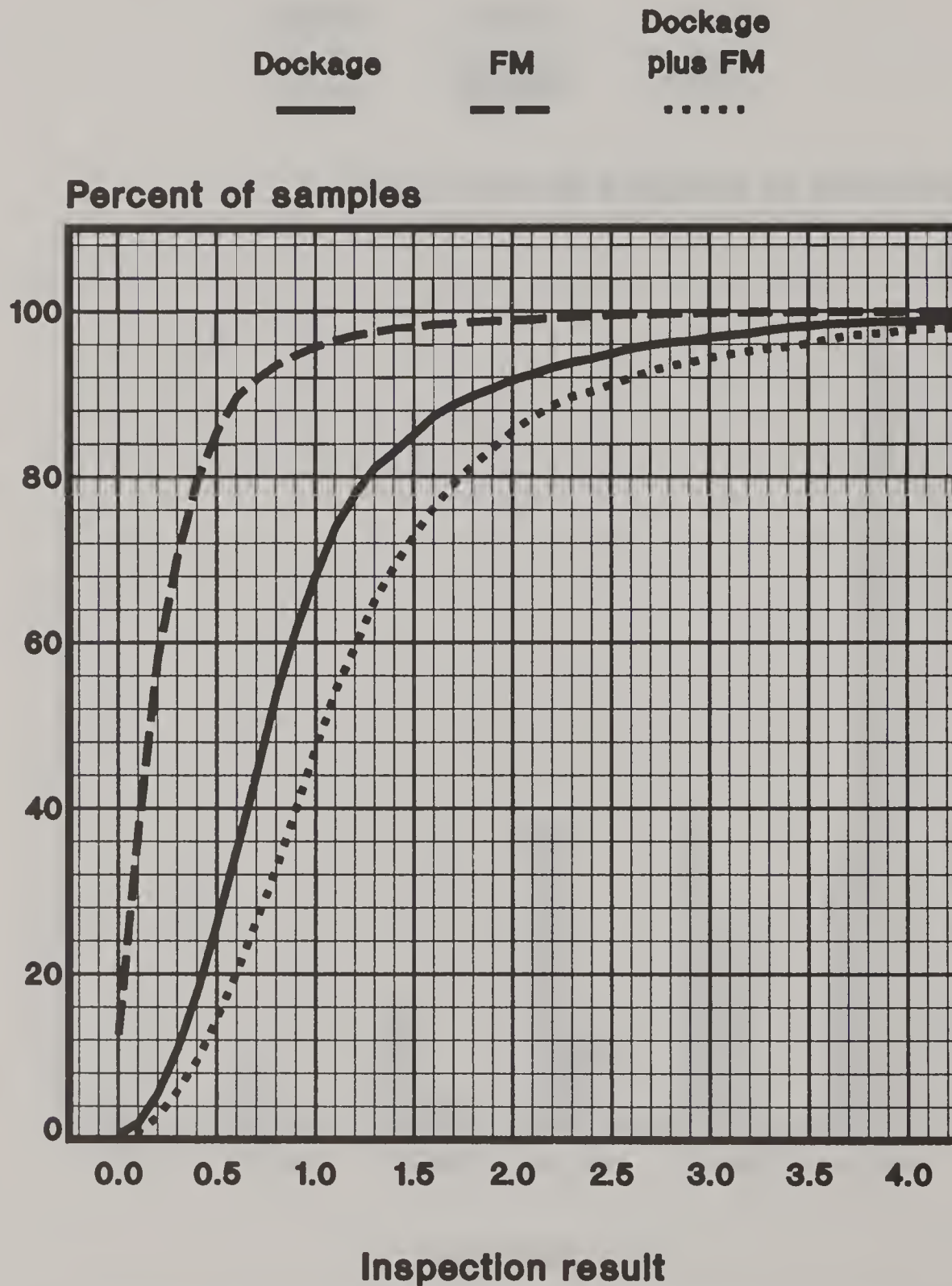
Grade Distribution using Alternative Systems



Based on 3,413 New Crop Survey samples, 1986-88

HARD RED SPRING WHEAT

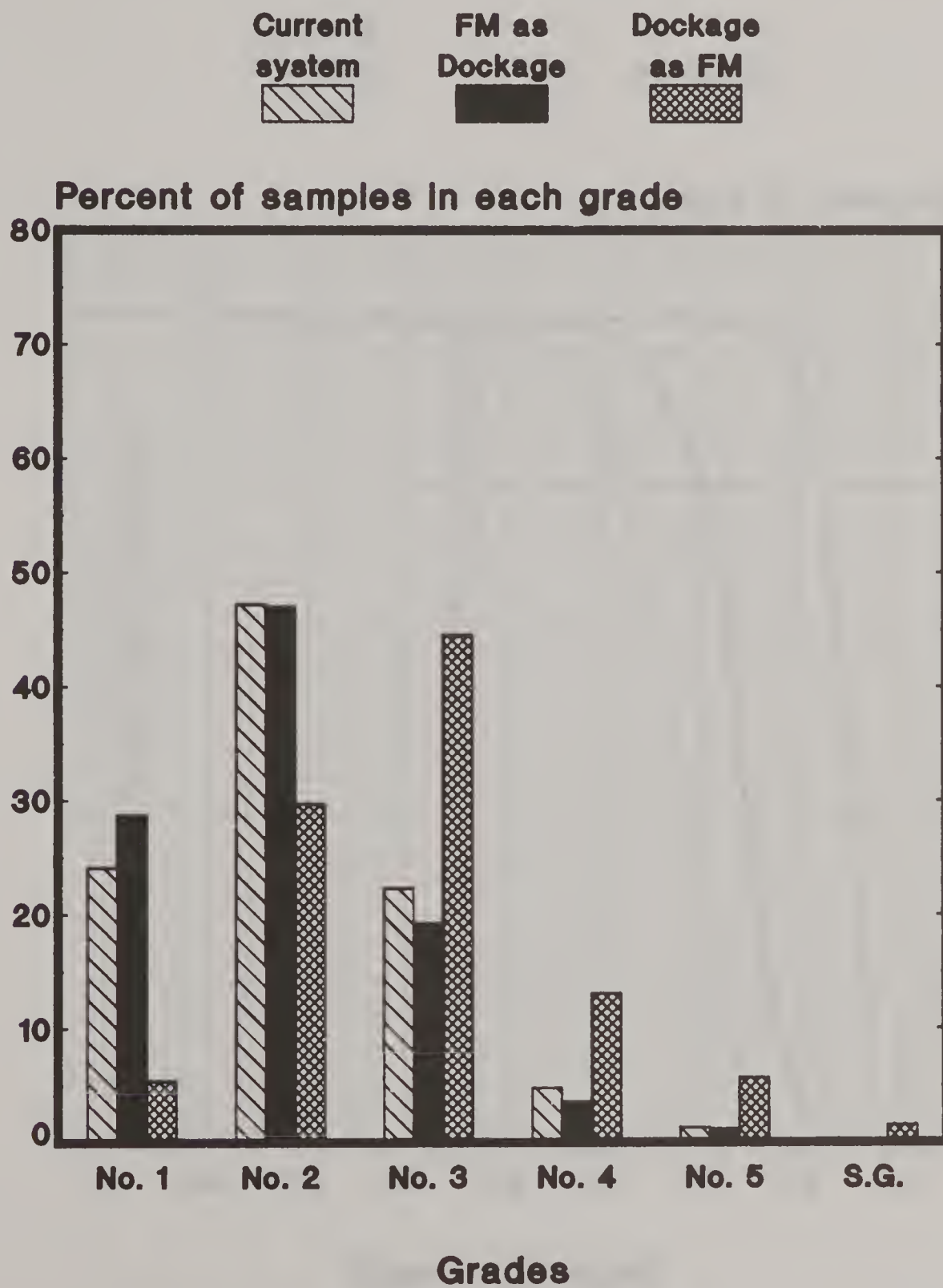
Cumulative Distribution of Factor Results



Based on 5,546 Domestic Movement Samples, Oct 1985–Nov 1988

HARD RED SPRING WHEAT

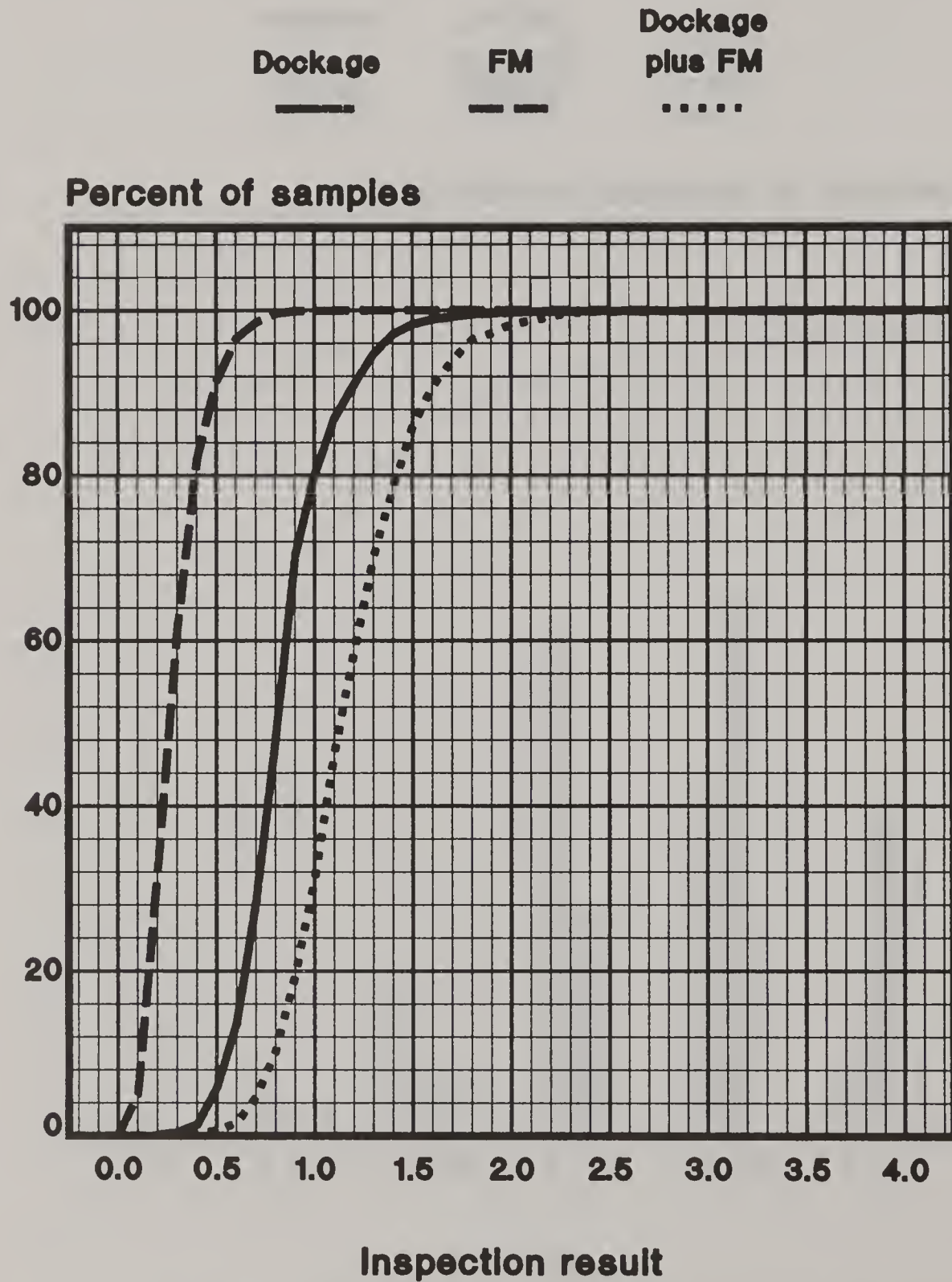
Grade Distribution using Alternative Systems



Based on 5,546 Domestic Movement Samples, Oct 1985–Nov 1988

HARD RED SPRING WHEAT

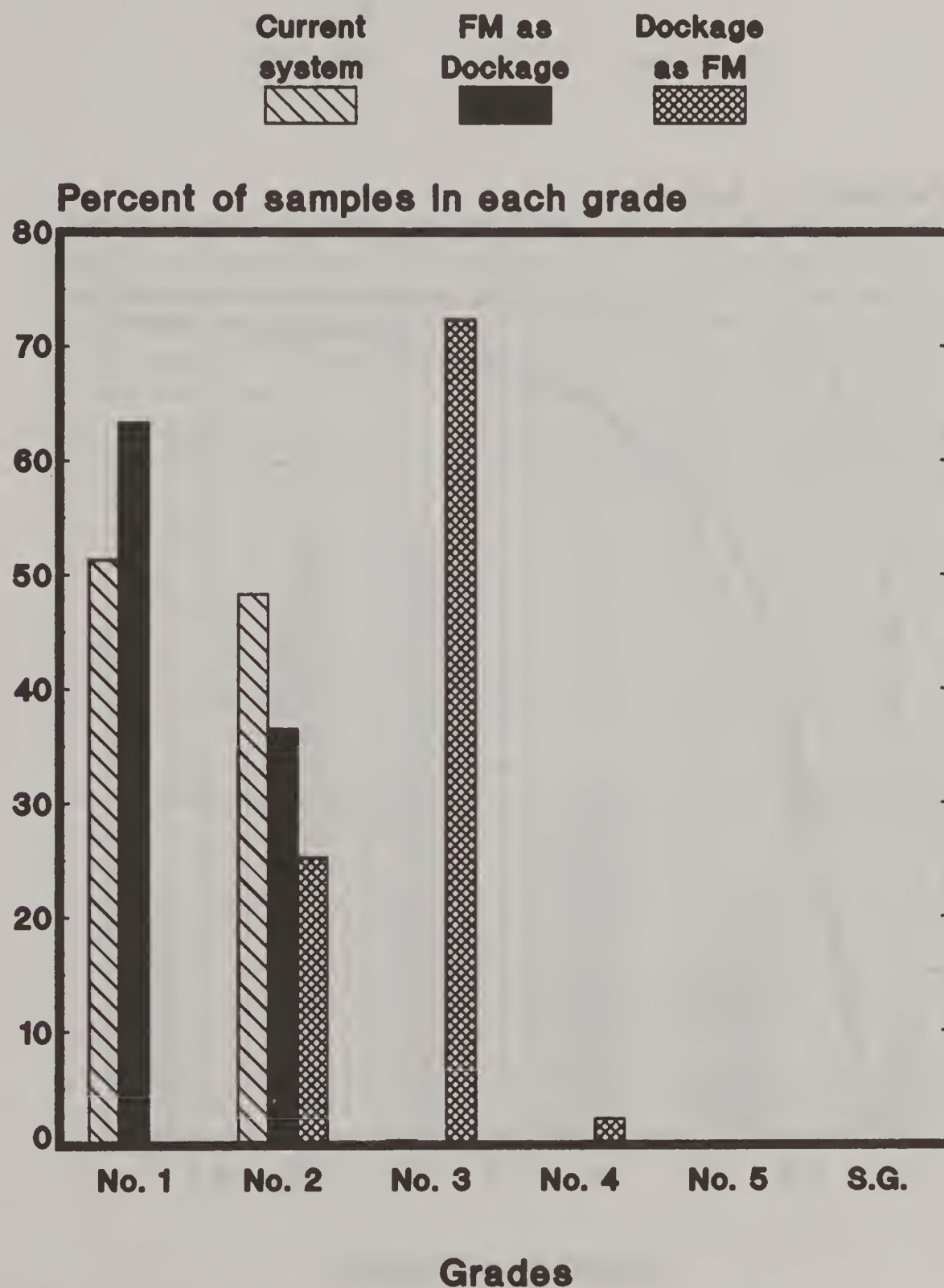
Cumulative Distribution of Factor Results



Based on 1,910 export lots, Oct 1985–Nov 1988

HARD RED SPRING WHEAT

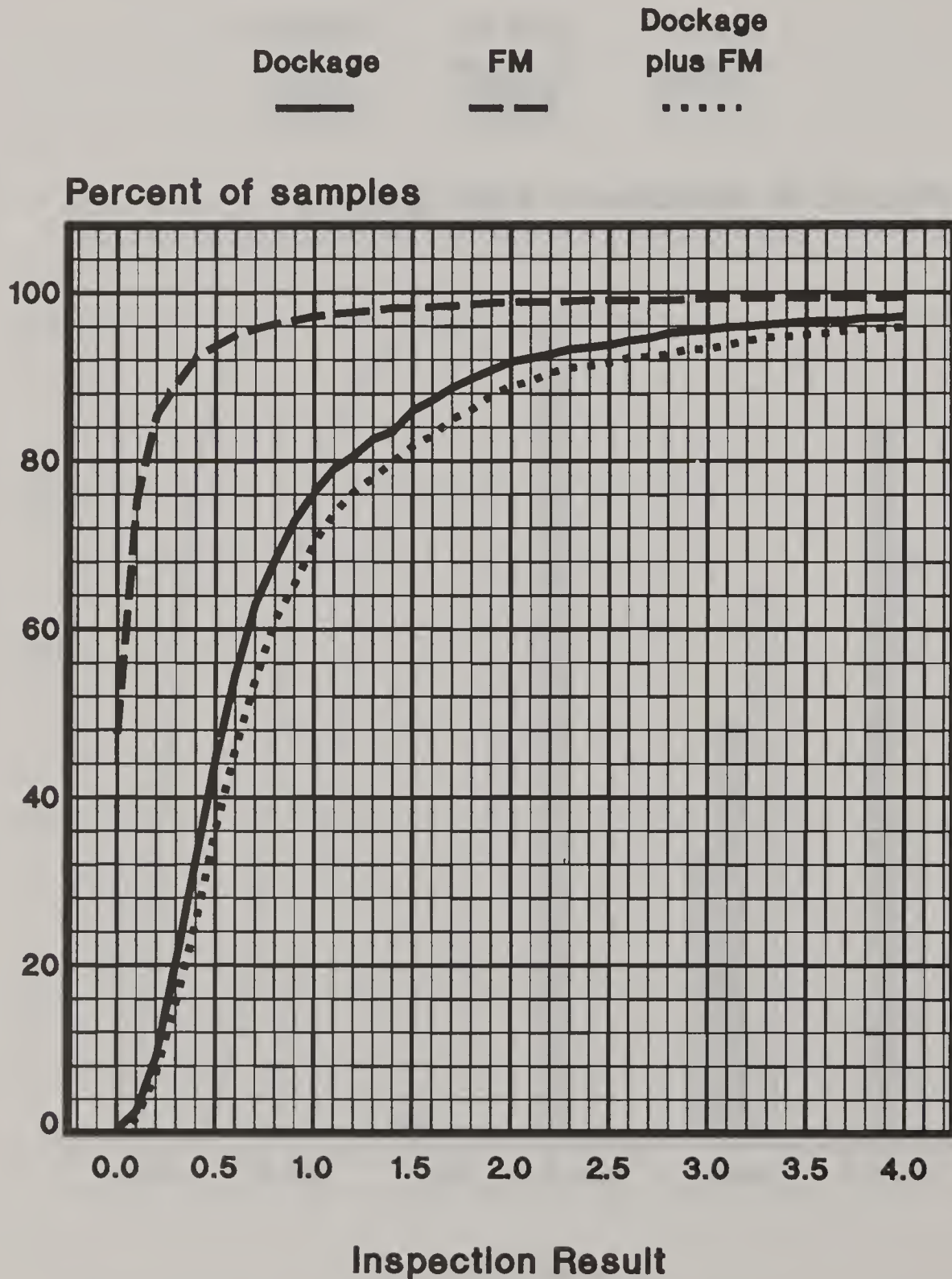
Grade Distribution using Alternative Systems



Based on 1,910 export lots, Oct 1985–Nov 1988

SOFT RED WINTER WHEAT

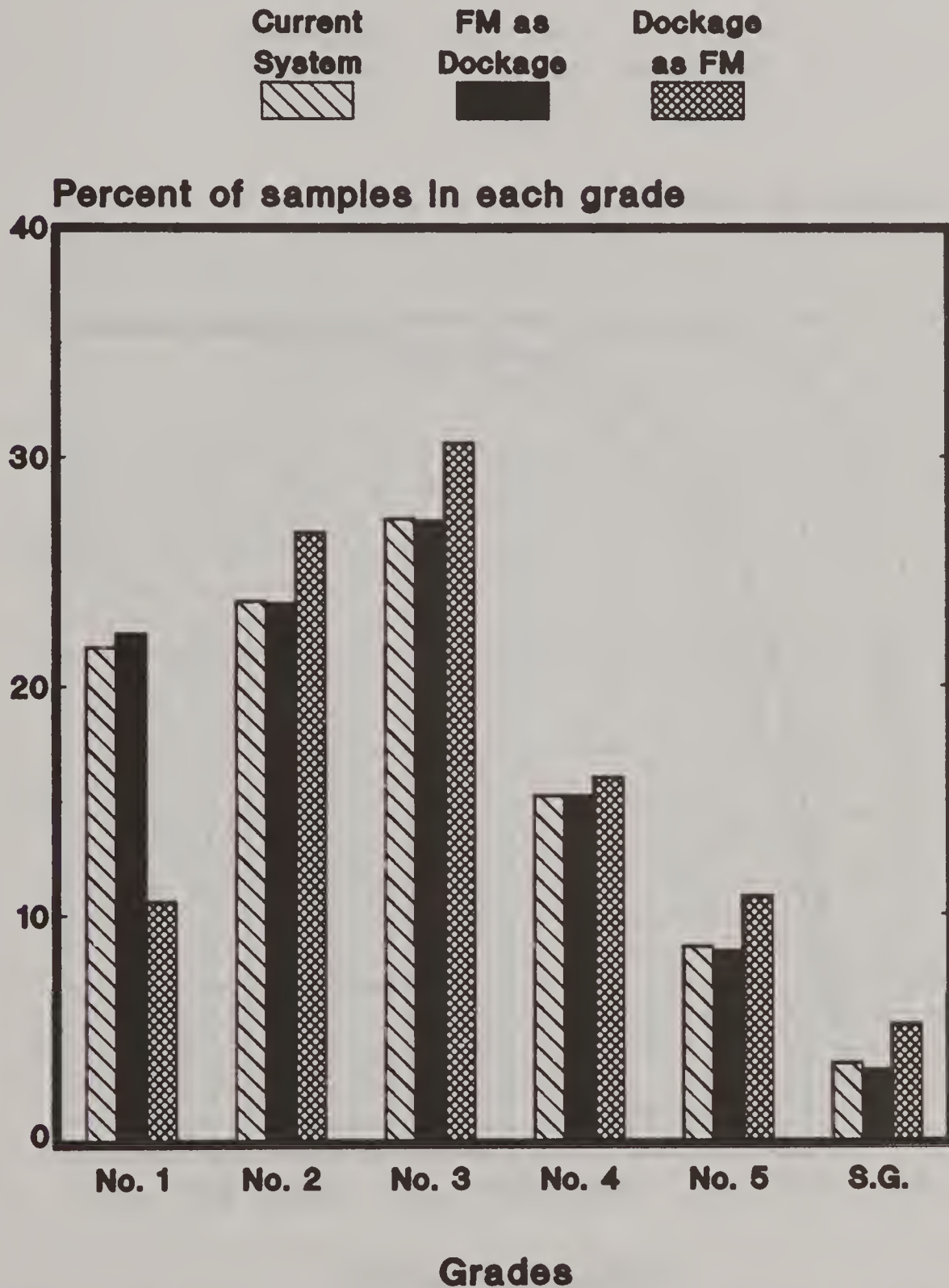
Cumulative Distribution of Factor Results



Based on 1,410 New Crop Wheat Study samples, 1986-88

SOFT RED WINTER WHEAT

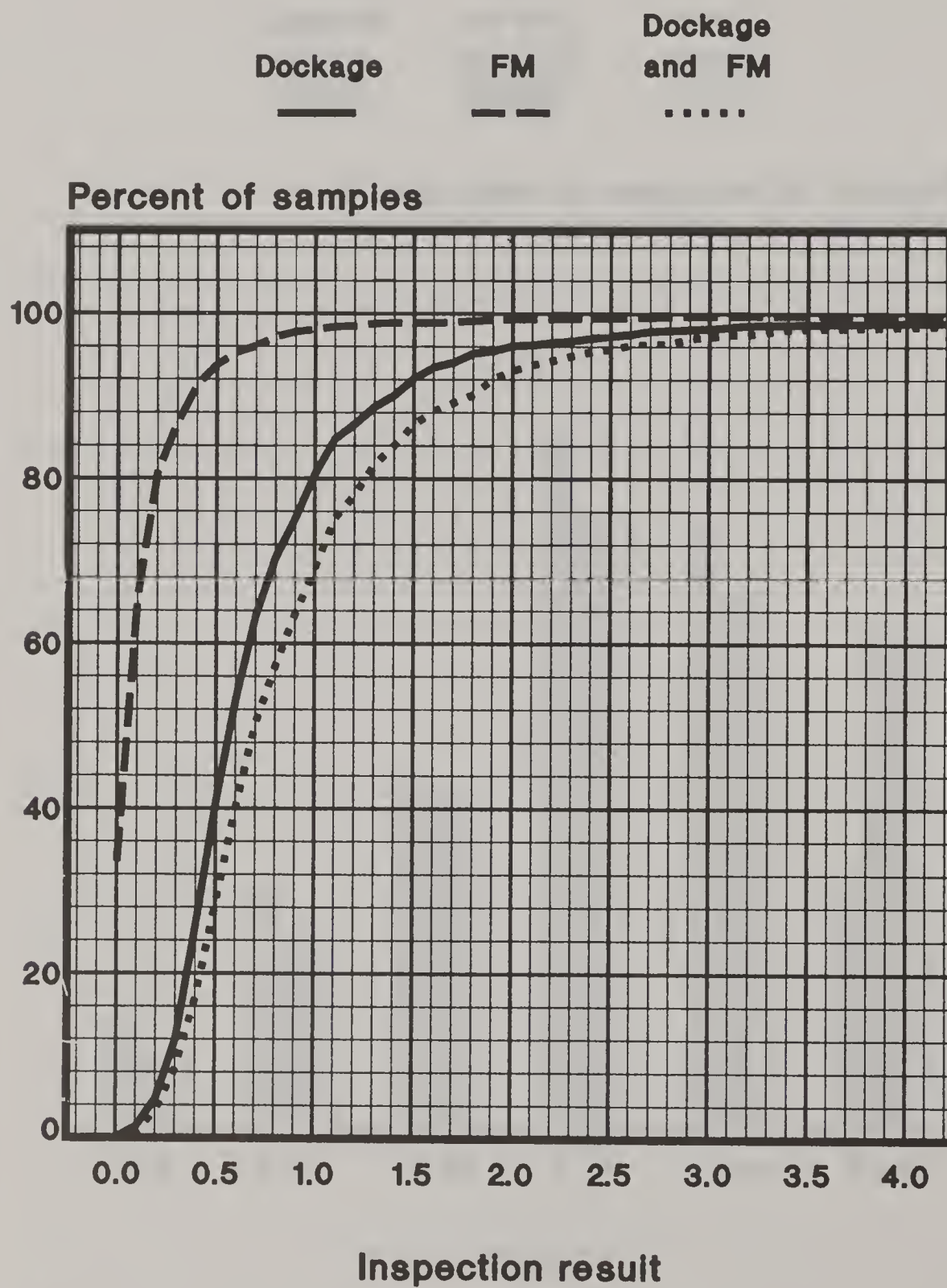
Grade Distribution using Alternative Systems



Based on 1,410 New Crop Survey samples, 1986-88

SOFT RED WINTER WHEAT

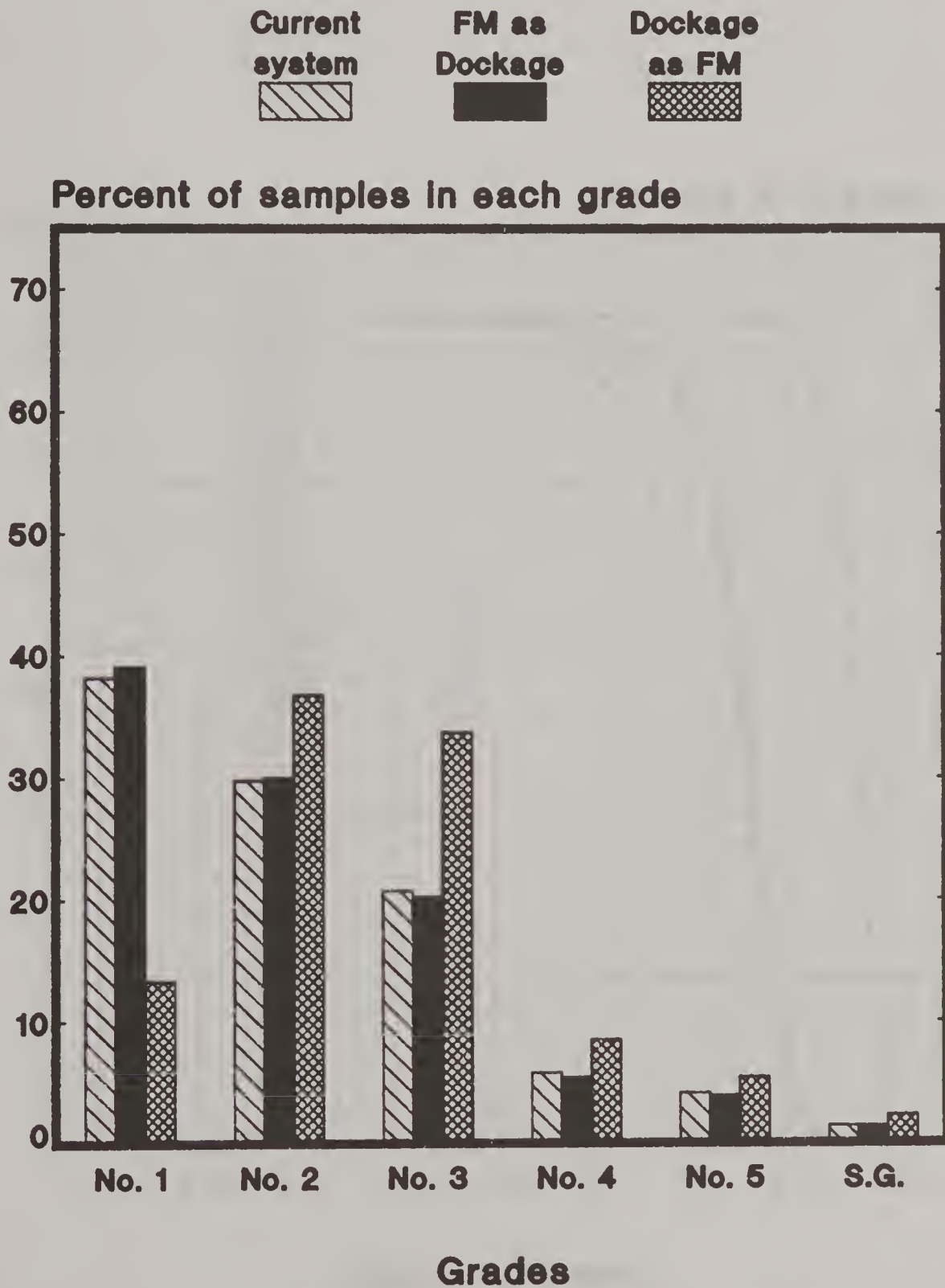
Cumulative Distribution of Factor Results



Based on 1,138 Domestic Movement samples, Oct 1985–Nov 1988

SOFT RED WINTER WHEAT

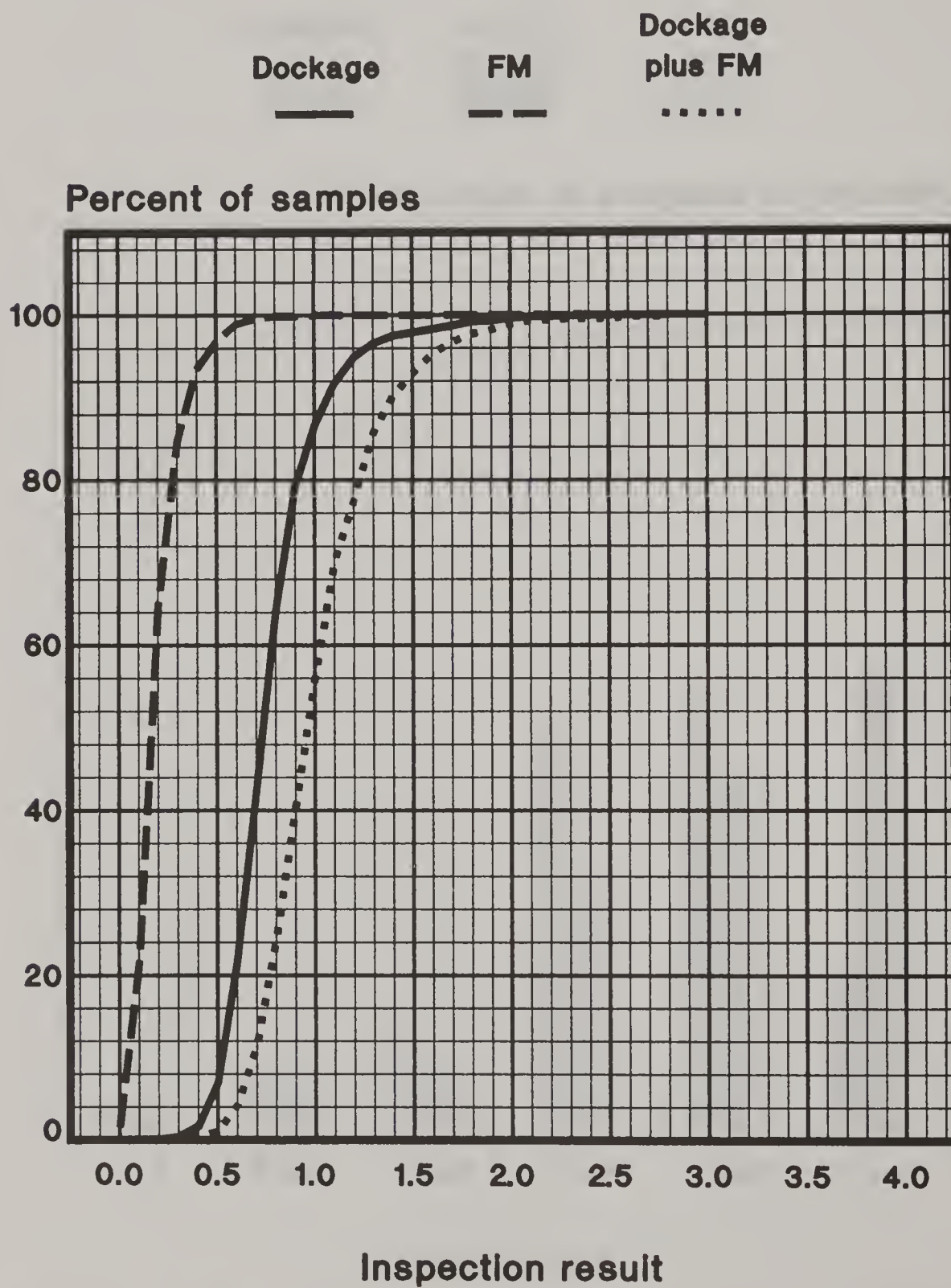
Grade Distribution using Alternative Systems



Based on 1,138 Domestic Movement Samples, Oct 1985–Nov 1988

SOFT RED WINTER WHEAT

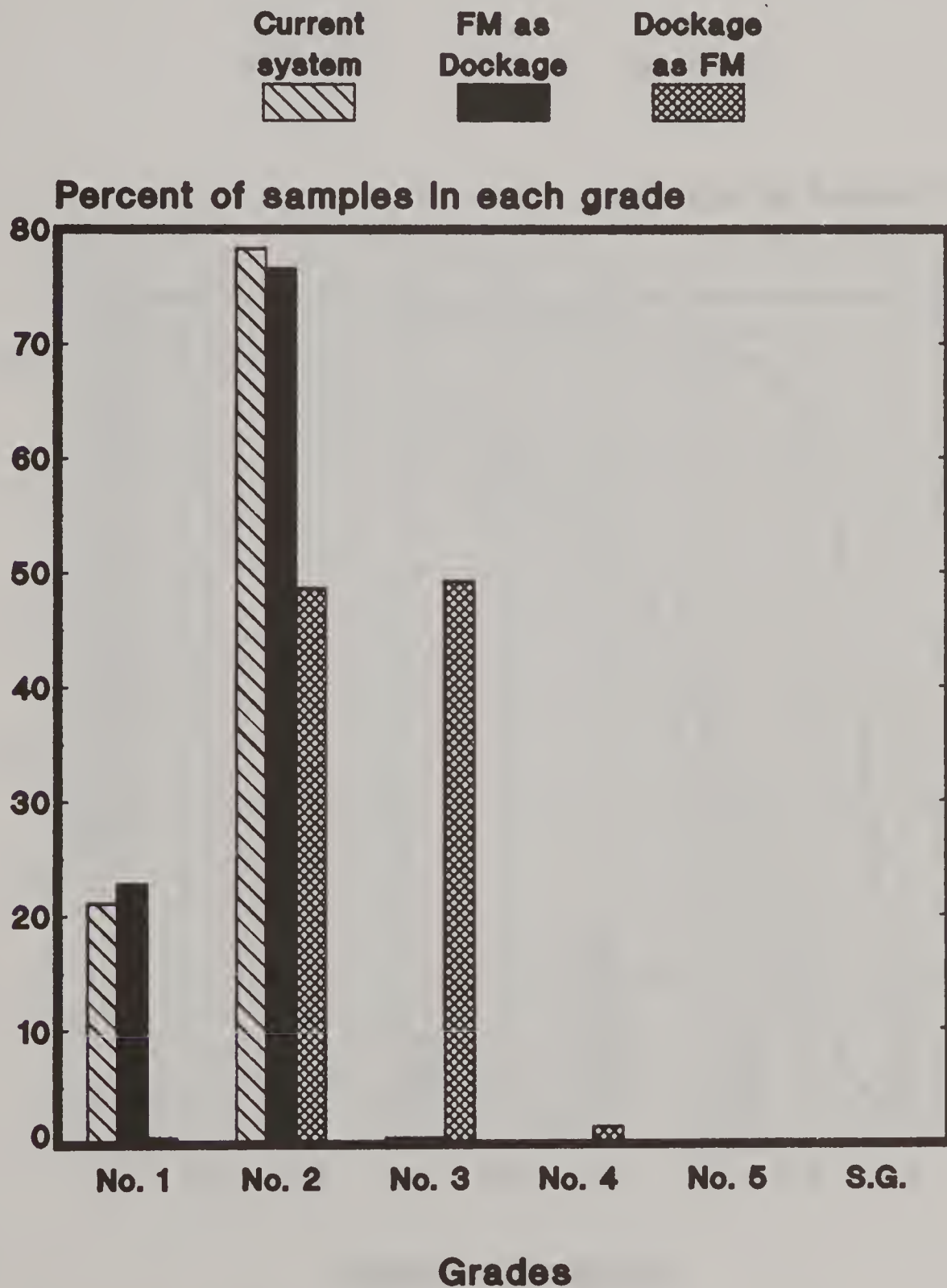
Cumulative Distribution of Factor Results



Based on 843 export lots, Oct 1985–Nov 1988

SOFT RED WINTER WHEAT

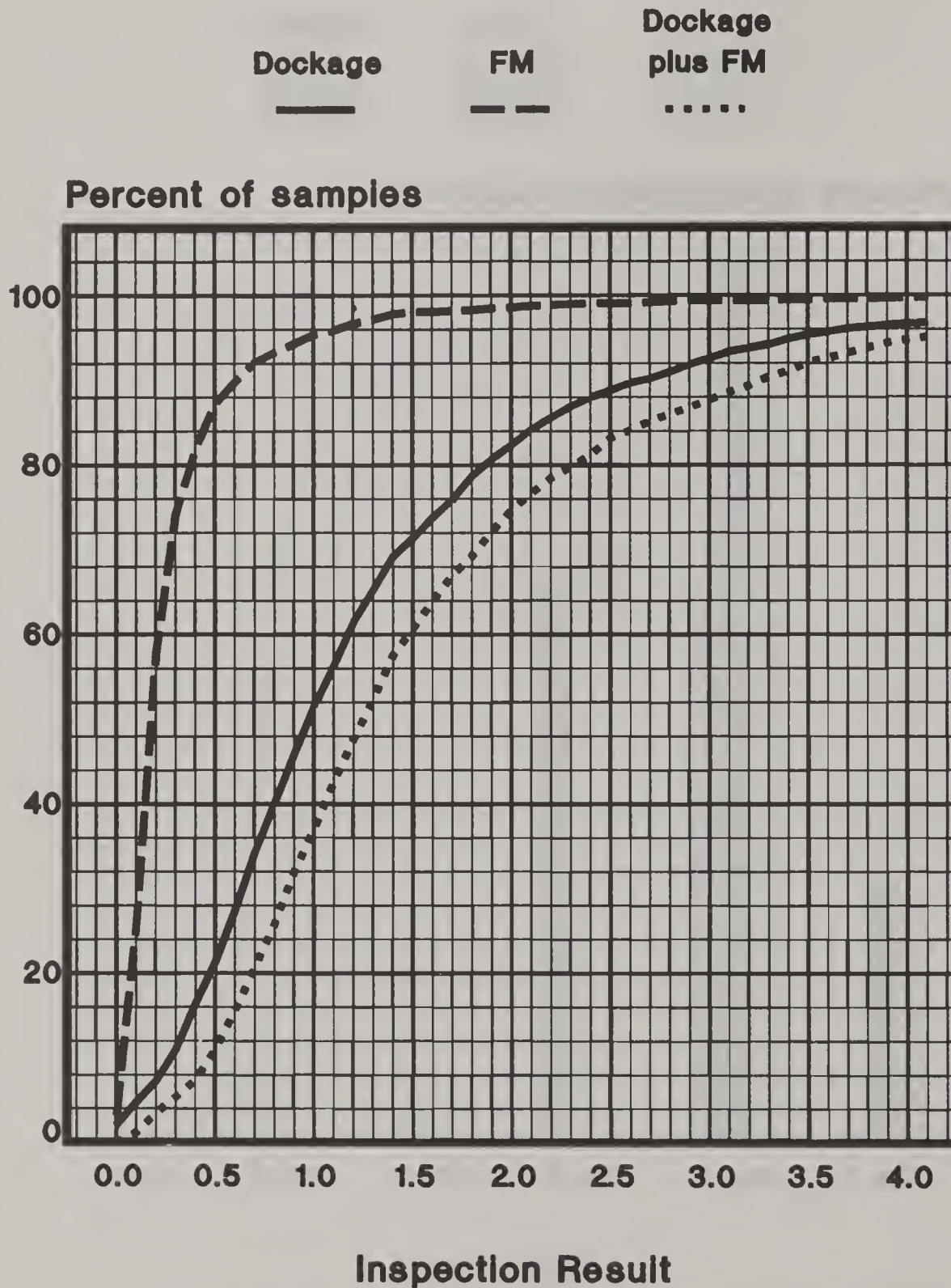
Grade Distribution using Alternative Systems



Based on 843 export lots, Oct 1985–Nov 1988

DURUM WHEAT

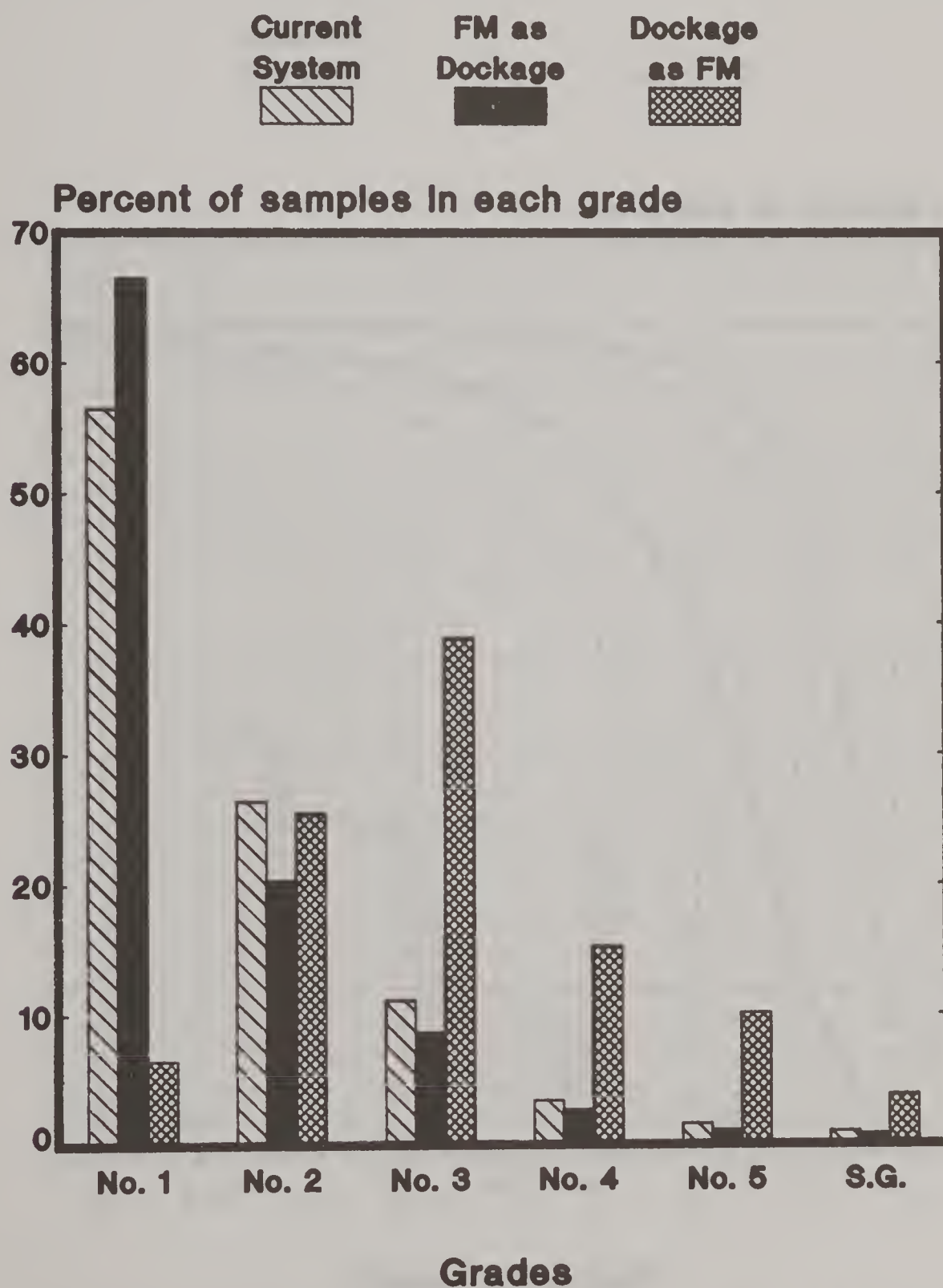
Cumulative Distribution of Factor Results



Based on 2,056 New Crop Wheat Study samples, 1986-88

DURUM WHEAT

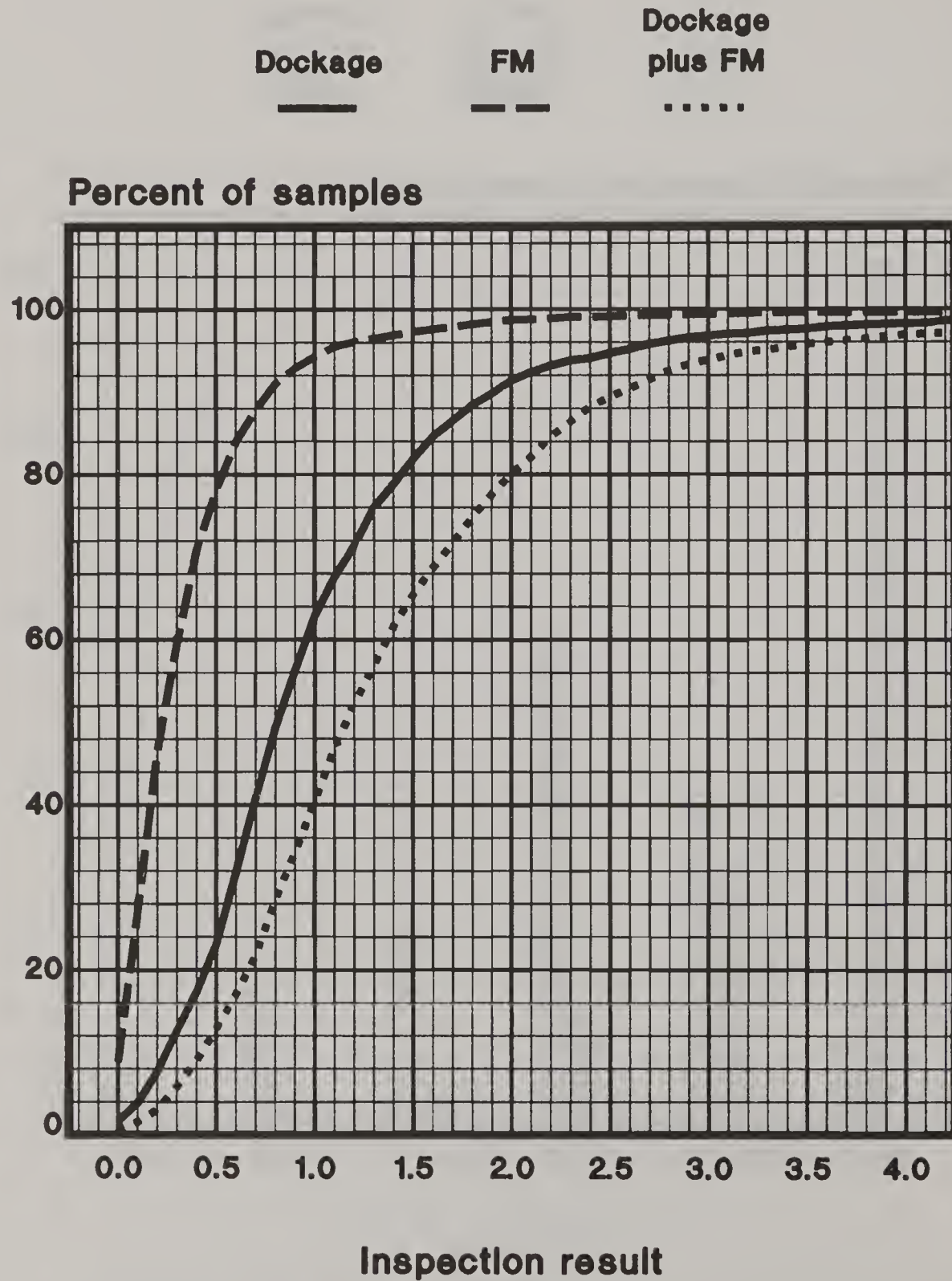
Grade Distribution using Alternative Systems



Based on 2,056 New Crop Survey samples, 1986-88

DURUM WHEAT

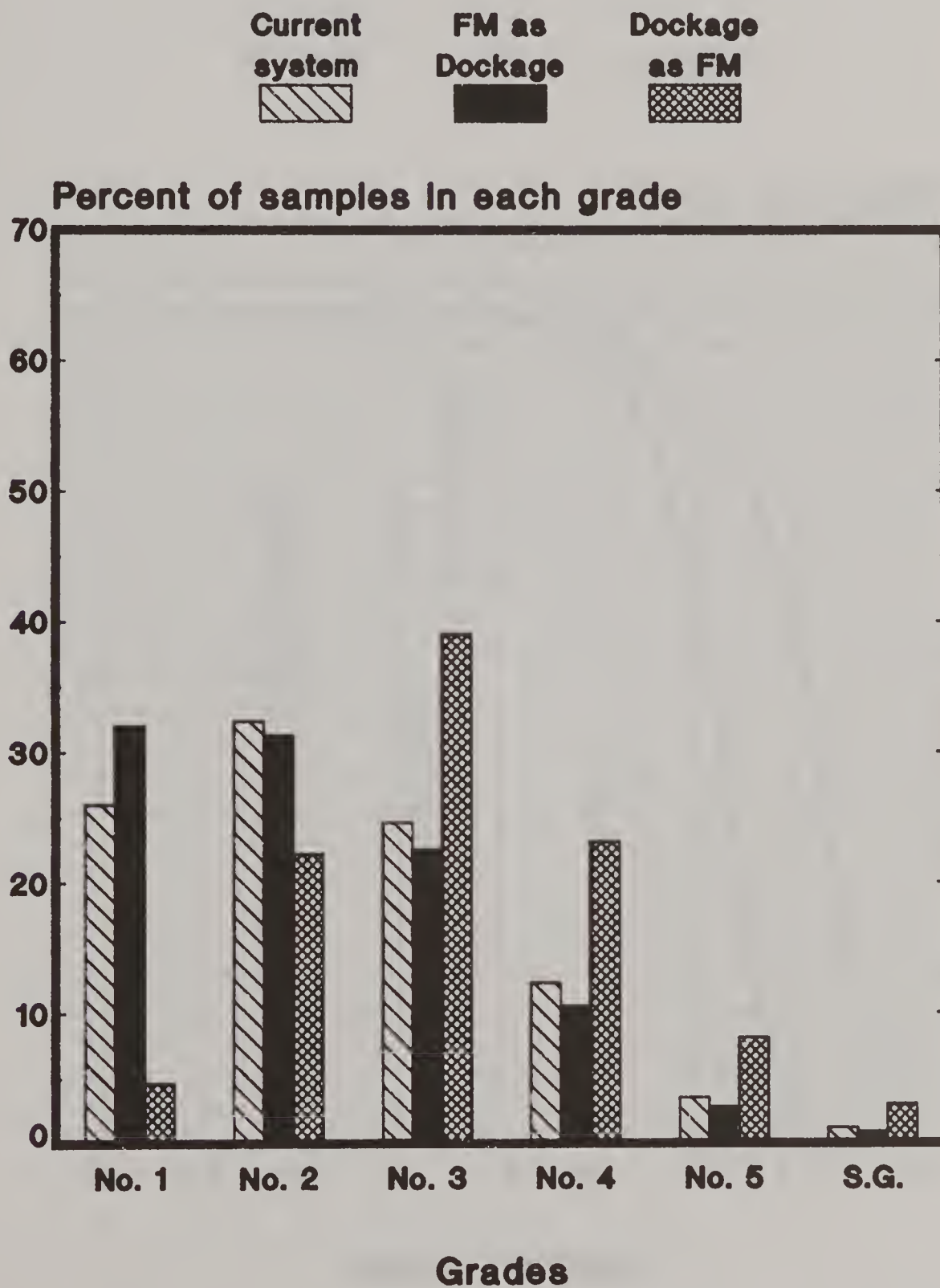
Cumulative Distribution of Factor Results



Based on 1,946 Domestic Movement Samples Oct 1985–Nov 1988

DURUM WHEAT

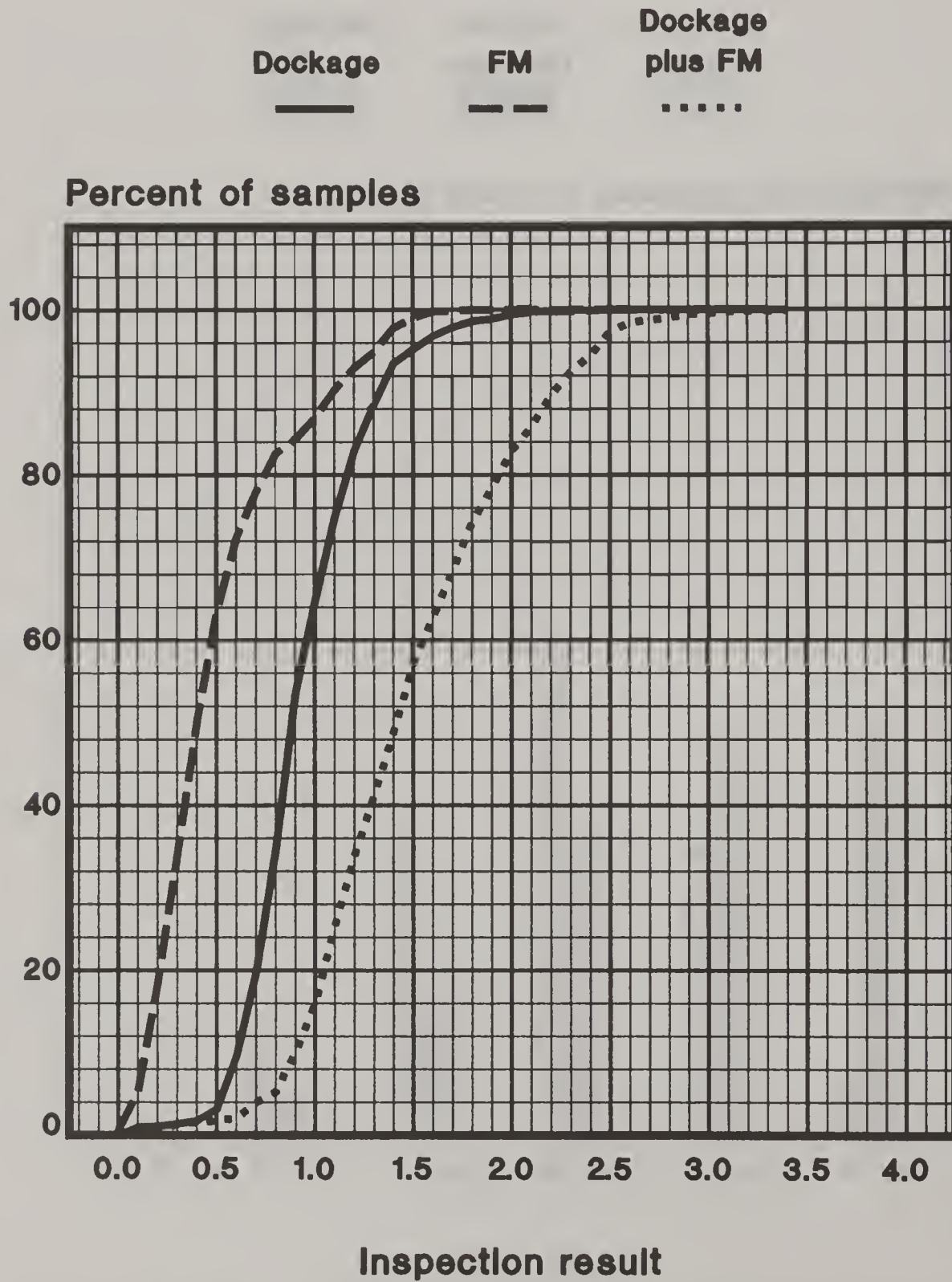
Grade Distribution using Alternative Systems



Based on 1,946 Domestic Movement Samples, Oct 1985–Nov 1988

DURUM WHEAT

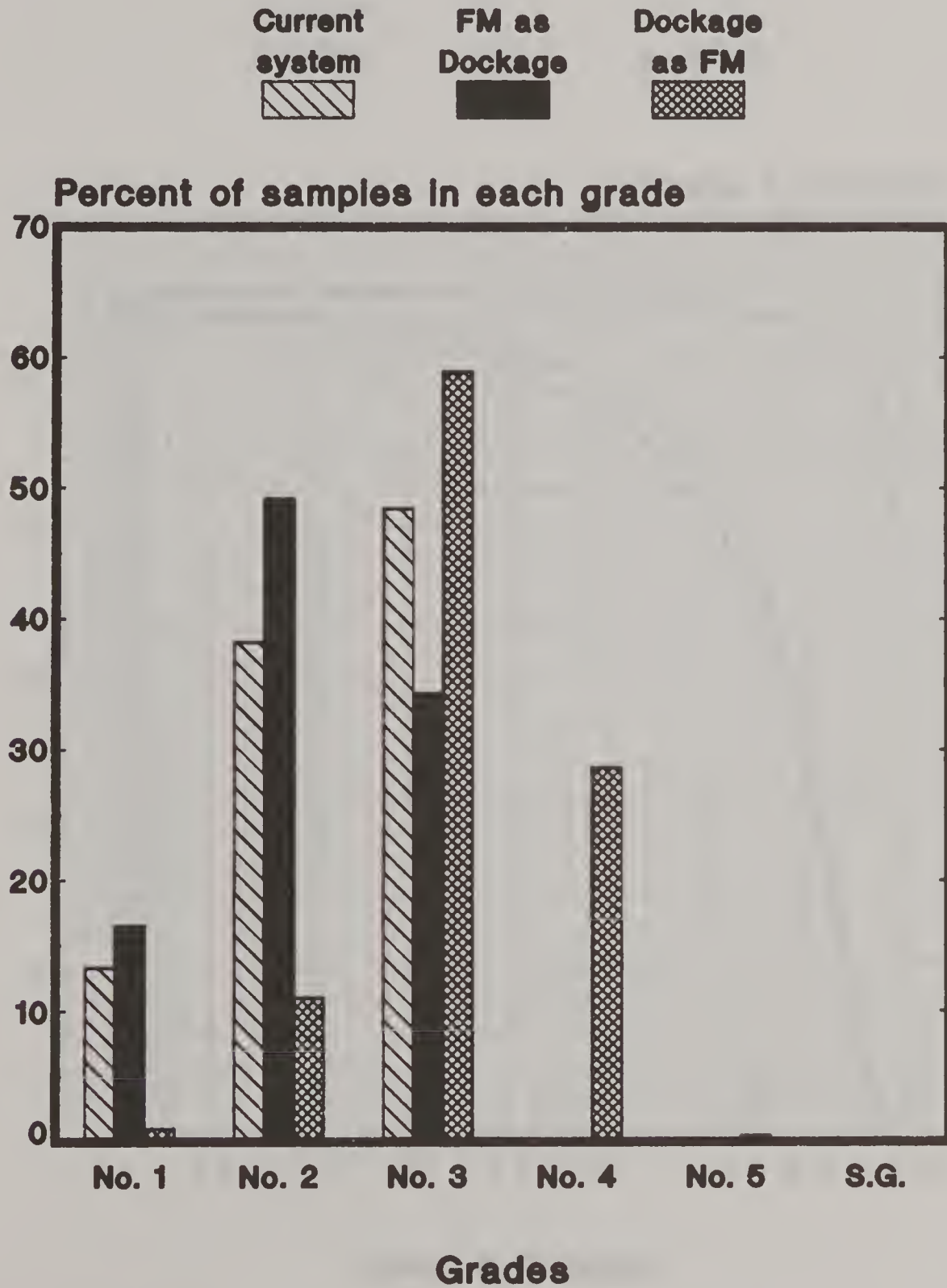
Cumulative Distribution of Factor Results



Based on 626 export lots, Oct 1985–Nov 1988

DURUM WHEAT

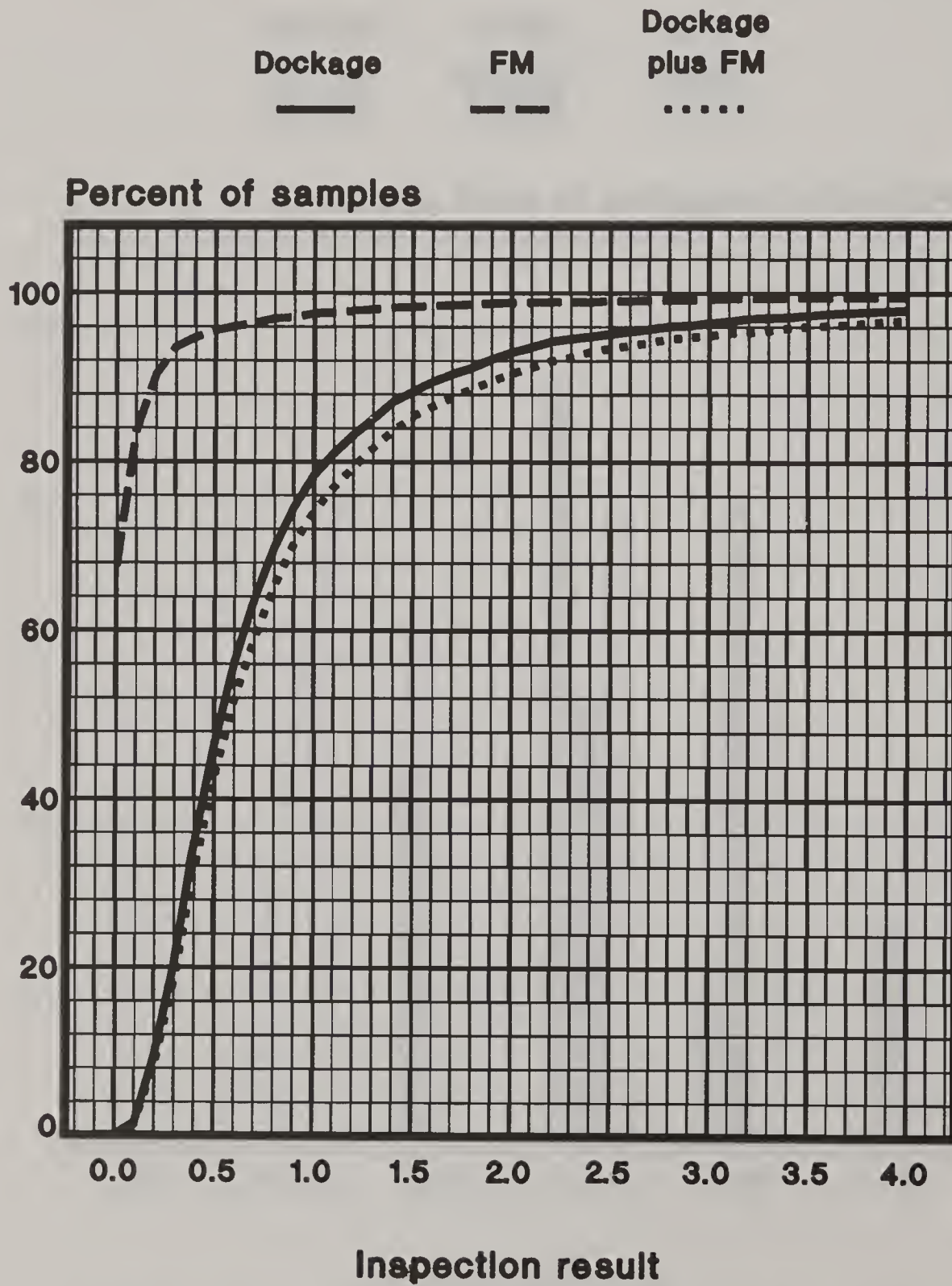
Grade Distribution using Alternative Systems



Based on 626 export lots, Oct 1985–Nov 1988

WHITE WHEAT

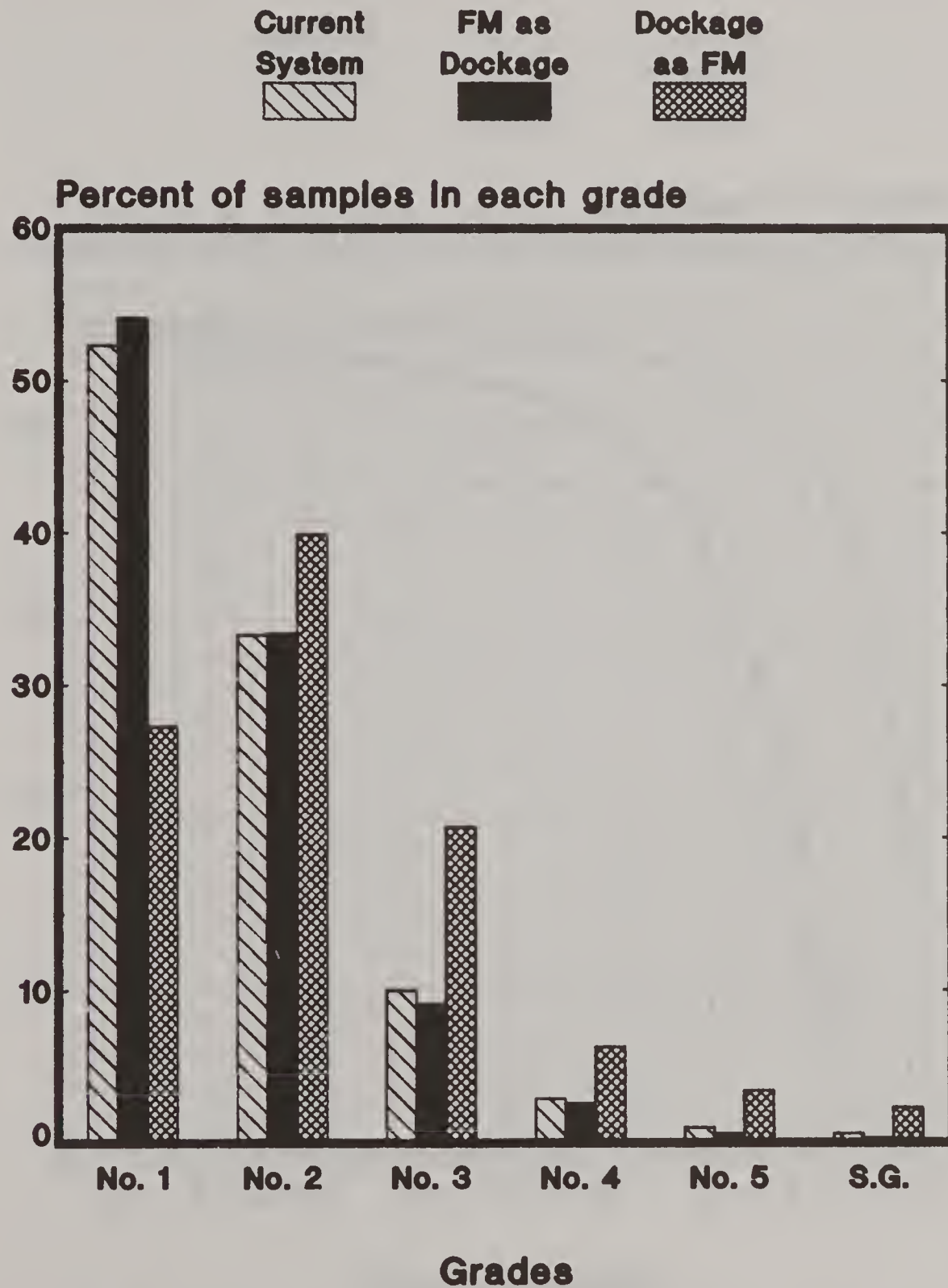
Cumulative Distribution of Factor Results



Based on 7,157 New Crop Wheat Study samples, 1986-88

WHITE WHEAT

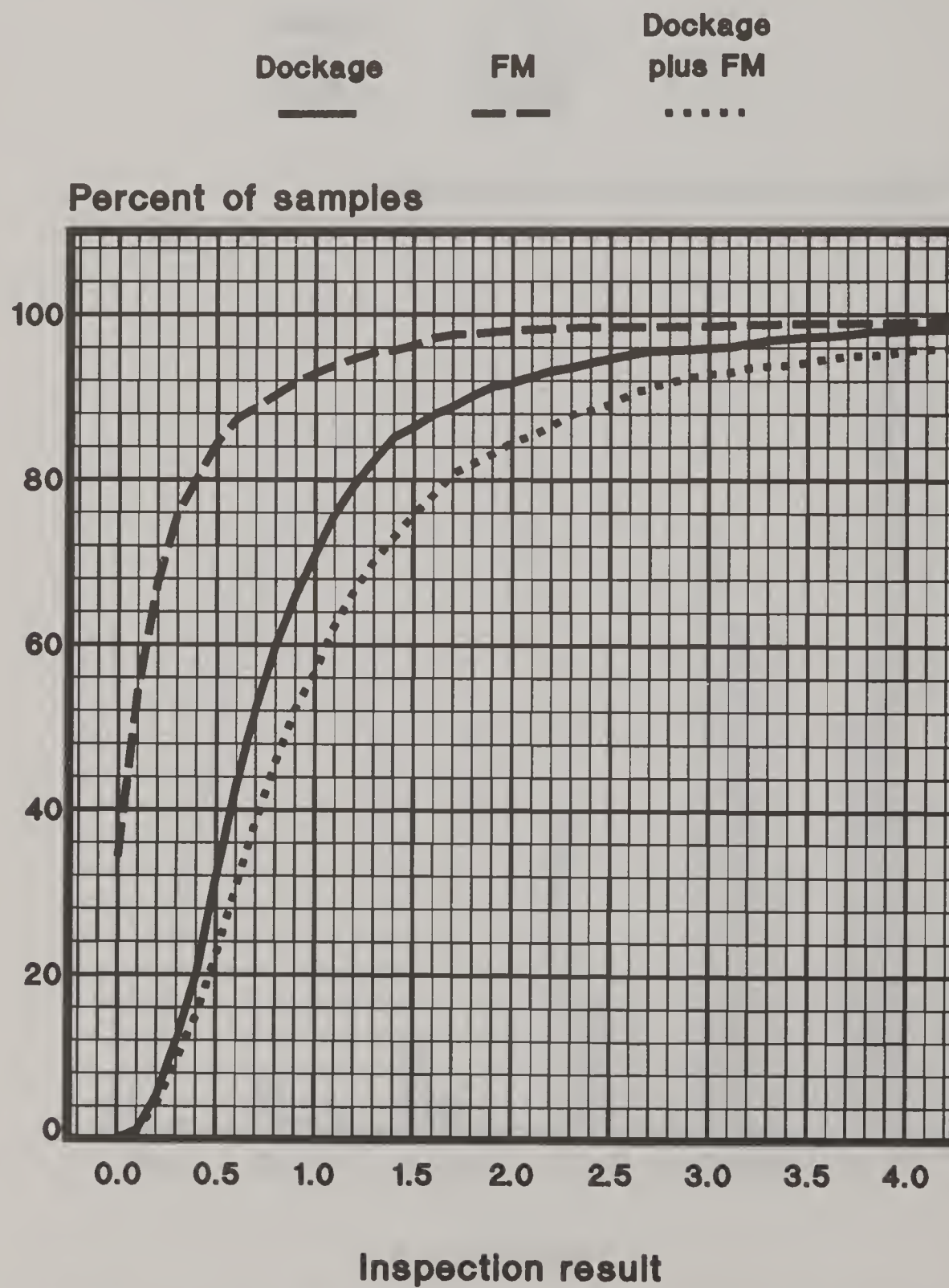
Grade Distribution using Alternative Systems



Based on 7,157 New Crop Survey samples, 1986-88

WHITE WHEAT

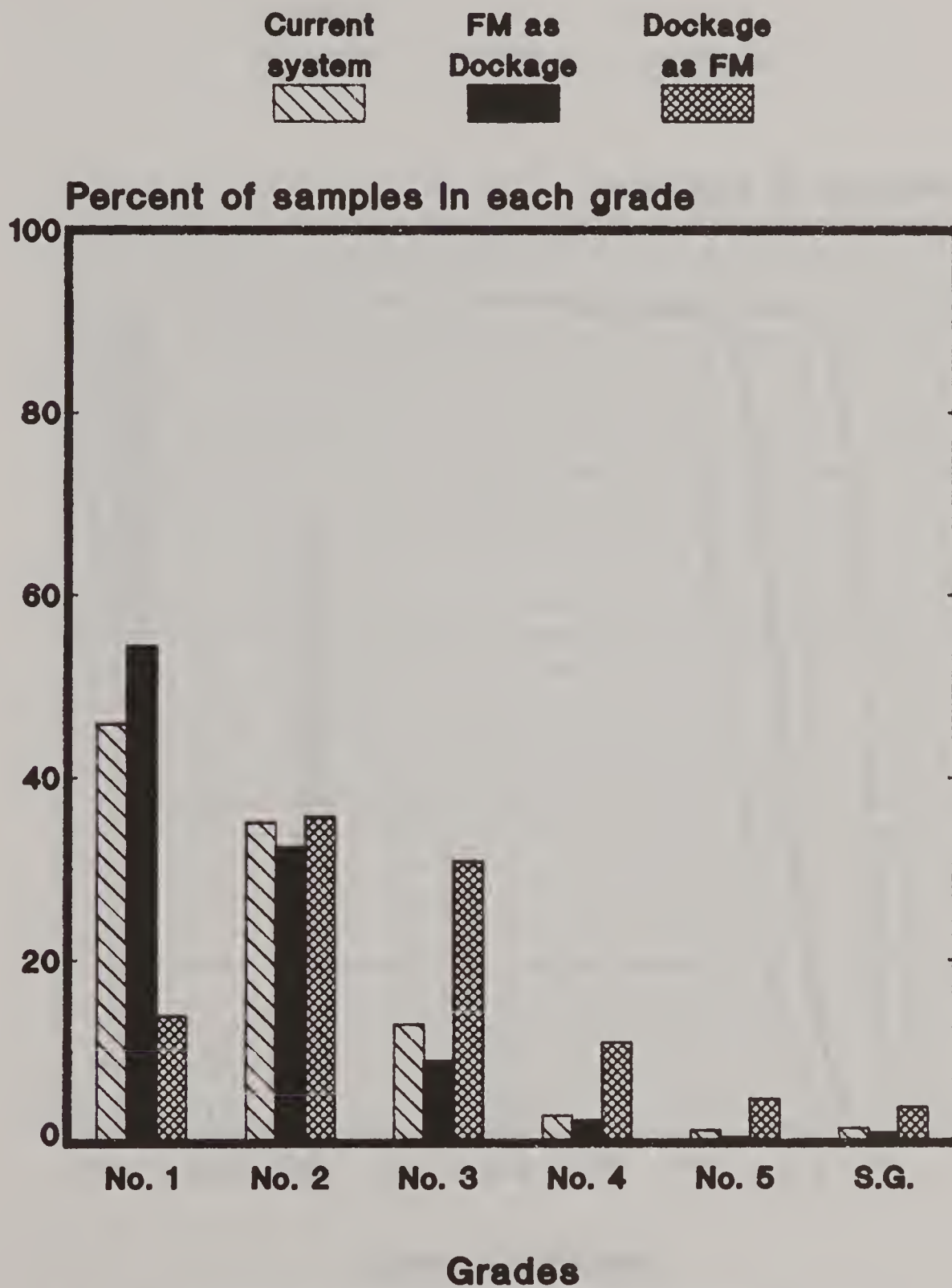
Cumulative Distribution of Factor Results



Based on 931 Domestic Movement Samples, Oct 1985–Nov 1988

WHITE WHEAT

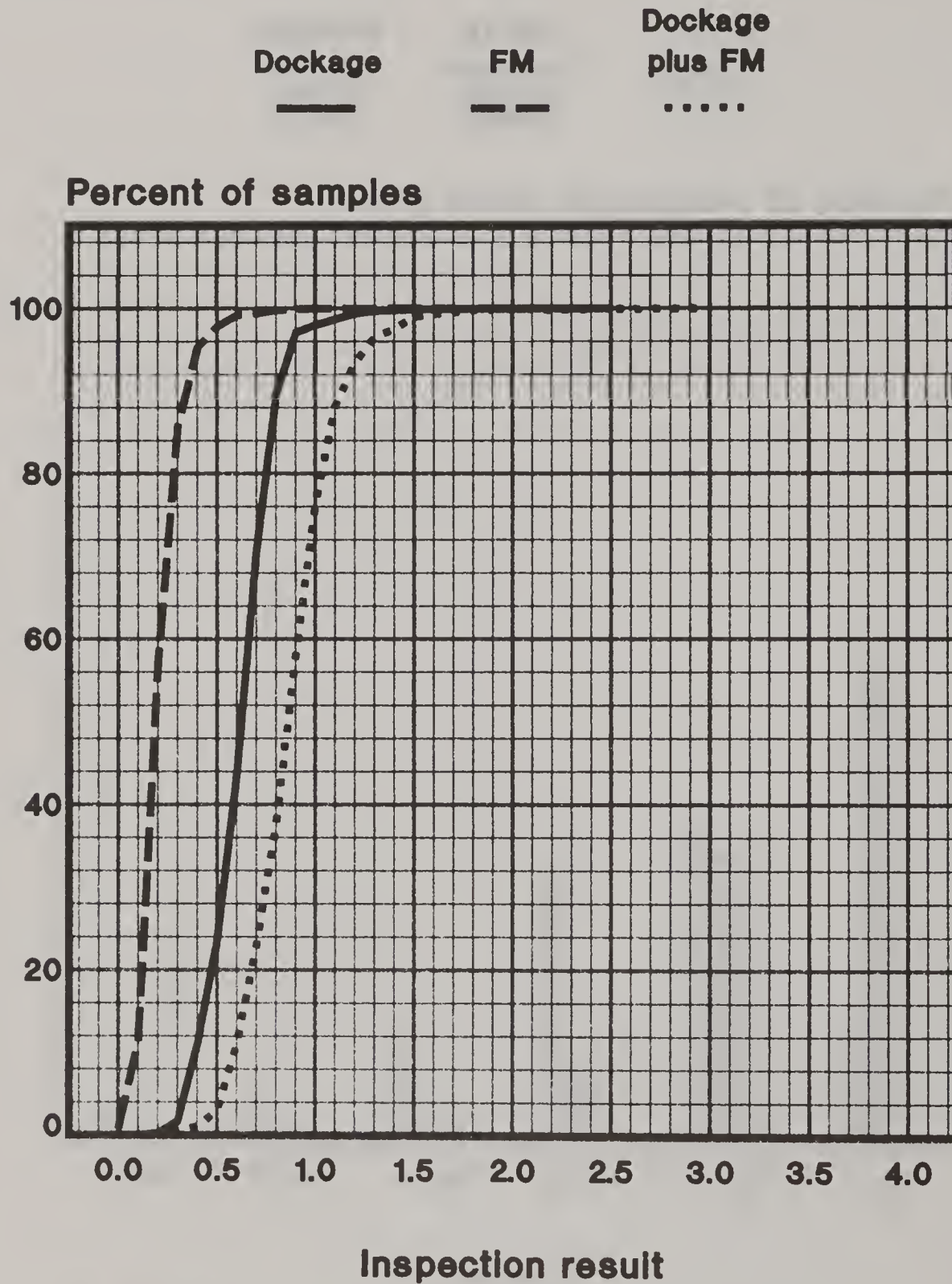
Grade Distribution using Alternative Systems



Based on 931 Domestic Movement Samples Oct 1985–Nov 1988

WHITE WHEAT

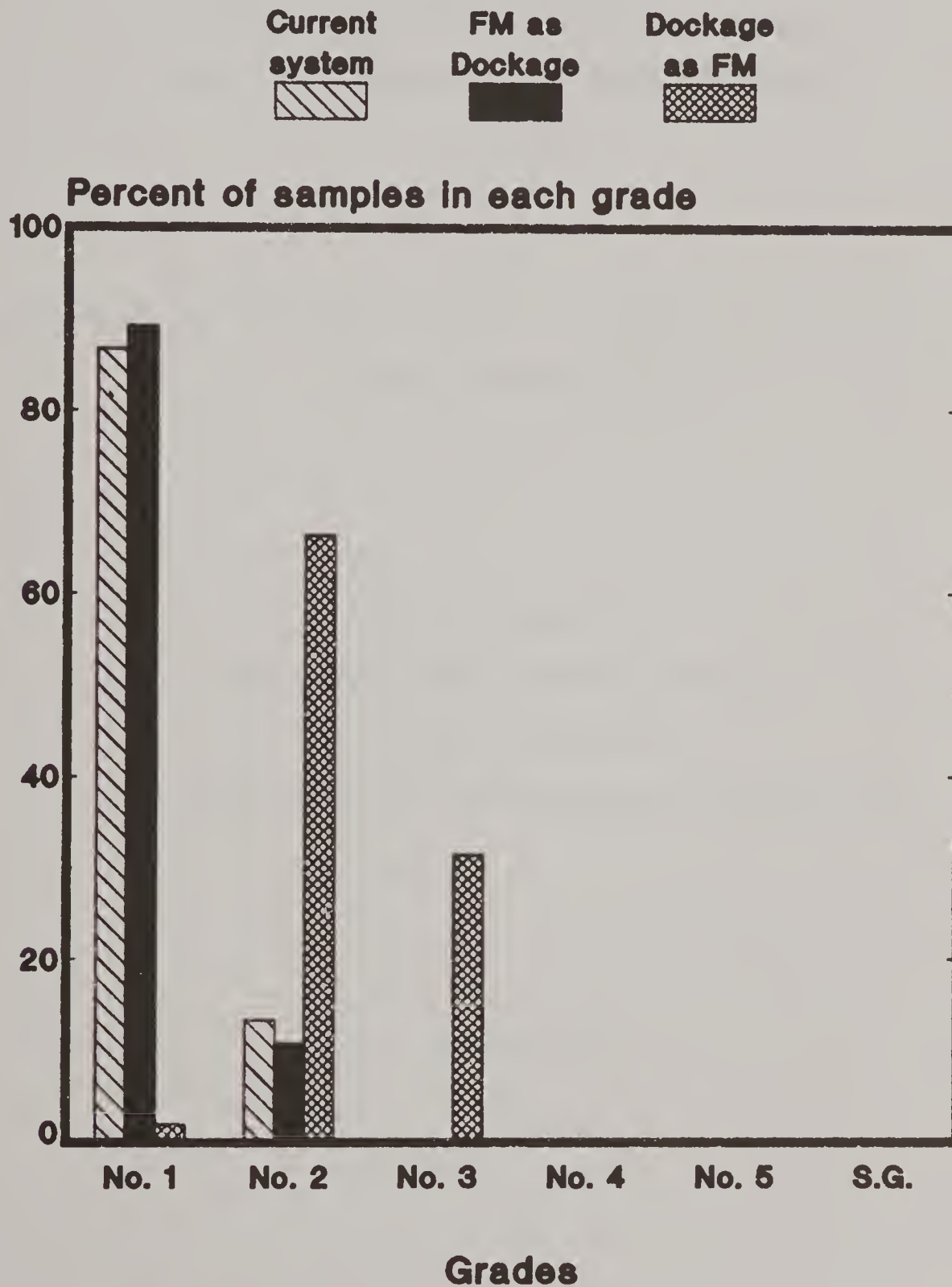
Cumulative Distribution of Factor Results



Based on 1,328 export lots, Oct 1985–Nov 1988

WHITE WHEAT

Grade Distribution using Alternative Systems



Based on 1,328 export lots, Oct 1985–Nov 1988

ECONOMIC IMPLICATIONS OF COMBINING DOCKAGE
AND FOREIGN MATERIAL IN THE GRADING STANDARDS
FOR WHEAT

BY

Stephanie A. Mercier, Mack N. Leath, C. Edwin Young, and William Lin
Economic Research Service

Report submitted to
the Federal Grain Inspection Service,
U.S. Dept. of Agriculture
For contribution to a Congressionally mandated study

March, 1989

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Executive Summary

The U.S. Grain Standards Act Amendments of 1988 required a study exploring the effects of combining dockage and foreign material (FM) into a single grading factor for wheat. This report focuses on the economic impacts that such a new standard -- either as a grade limit factor or as a deductible factor -- would have on wheat producers, handlers, and exporters.

The United States is the only major exporter that measures and reports dockage as a quality factor separate from foreign material. Dockage, although reported on the inspection certificate, does not serve as a grading factor. As a non-grading factor, it is removed from the sample being inspected before other factors are measured. The removal of dockage prior to measuring other grading factors results in greater precision in the measurement of those factors. Dockage is distinguished from foreign material on the basis of particle size, weight, and ease of mechanical removal from a sample of wheat.

The marketing or inspection agencies in other major exporting countries report only one measure of non-millable material. Therefore, many importers are not familiar with dockage, and they have some difficulty in knowing how to measure or interpret the dockage content of imported wheat. Domestic millers, on the other hand, are quite comfortable with dockage as a measure. The grain that they purchase is not required to be graded so they assign discounts/premiums to factors to specify the quality they want. If adopted, the combined grading factor would primarily affect our export market.

Dockage content now appears as a negotiable item in many export contracts, particularly with Pacific Rim importers. The proposed change, which would eliminate dockage as a separate factor, would permit more uniformity in export

contracts. It would also encourage producers and exporters to dispatch cleaner grain in a effort to maintain or even expand the U.S. market share.

Data provided by the Federal Grain Inspection Service (FGIS) for the period 1984-88 indicate that most classes of wheat exported contained less dockage and foreign material in 1988 than in 1984. However, this wheat still contained more dockage and FM than that of two of our major competitors, Australia and Canada, for whom comparable data are available.

The economic impacts of adopting a grading factor which combines dockage and foreign material were estimated for both its enforcement as a grade determining factor and as a deductible factor (table A). If the combined amount of dockage and foreign material was used as a grade determining factor, given the current limit on foreign material content for U.S. Grade No. 2 of 1.0 percent, the added cost would range between \$18.7 and \$19.9 million, depending on the year for which the costs were estimated (Table A). The combined dockage and foreign material factor could be treated as a discount factor, either with established market discounts or with deduction for weight. The costs under this alternative in 1987/88 would range between \$22.3 million (for the discount schedule) and \$5.4 million (for deduction by weight).

Producers could reduce discounts by cleaning wheat at the country elevator to meet grade specifications. The costs of cleaning the wheat would range from \$23.4 to \$26.7 million if the dockage removed to meet the grade limit for U.S. No. 2 at the county elevator was discarded. If the screenings could be sold to feed processors and used as a feed ingredient, between \$2 and \$3 million of the cleaning costs could be recovered (assuming screenings valued at half the market price for millrun).

Table A. Costs of Combining Dockage and Foreign Material as a Grade Determining Factor in the Standards for Wheat, 1984/85 and 1987/88

METHOD	Marketing year	
	1984/85	1987/88
	\$ millions	
Grading ¹	18.71	19.93
Discount ²	20.85	22.27
Weight deduction ³	10.86	5.39
Clean without resale	26.75	23.42
Clean with resale ⁴	24.17	21.45

¹Valued at 1989 price differentials.

²Valued at 1987/88 crop year prices for each wheat class.

³Valued at crop year prices for each wheat class.

⁴Screenings valued at one half of 1989 millrun prices (\$1.33 a bushel).

Considering all options, the addition of dockage to the FM grading standard would cost the wheat industry between \$5.5 and \$27.5 million, depending on the year examined for the study. These amounts are between 0.1 to 0.6 percent of annual value of U.S. wheat export sales. It is likely that discounting practices and price differentials in the market would adjust under a new grading environment. Producers could probably shift some of the cost burden, depending upon the relative market strengths of producers, exporters, and consumers.

Questions have been raised in the domestic wheat industry as to why a standards change would be proposed. Many industry sources view it as reducing the amount of information available on the official inspection certificate, rather than as an adjustment that would lead to an improvement in the quality

of the wheat shipped. Such a modification would also be counter to changes being considered for corn and sorghum grading standards. For those grains, consideration is being given to separating such factors on the grading certificate.

ECONOMIC IMPLICATIONS OF COMBINING DOCKAGE AND FOREIGN

MATERIAL IN THE GRADING STANDARDS FOR WHEAT

by

Stephanie A. Mercier, Mack N. Leath, C. Edwin Young, and William Lin¹

Introduction

The United States Grain Standards Act Amendments of 1988 (H.R. 4345), required that the Secretary of Agriculture conduct a study of the effects of including dockage with foreign material (FM) as a grading factor for wheat. The mandate required that a report of the results of such study be submitted not later than June 1, 1989 to the Senate and House Agriculture Committees. The study was requested by Congress in order to determine the economic implications of combining dockage and foreign material as a single factor for assessing the quality of wheat. The study was to consider using the combined measure either as a grading factor or as a weight deduction discount. This report summarizes the findings of an economic evaluation conducted by the Economic Research Service (ERS) in cooperation with the Federal Grain Inspection Service (FGIS). The analysis focuses on the economic impacts that combining dockage and FM into a single grading factor would have on wheat producers, handlers, and exporters.

Dockage is defined as the percentage of non-millable material, including wheat chaff and dust, weed seeds, grain other than wheat, sand, dirt, and any other material which can be removed readily and easily from a sample of wheat with appropriate screens and cleaning devices. This material is distinguished

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from FM at present because foreign material as defined by FGIS is non-wheat material which cannot be mechanically separated with a carter dockage machine from the usable wheat within the sample. The United States is the only major wheat producer that measures and reports dockage as a separate factor on the official grade certificate for wheat. However, dockage is a non-grading factor and it is removed from the sample being inspected before other factors are measured. The removal of dockage prior to measuring other grading factors results in greater precision in the measurement of those factors. The grading factors currently in use by FGIS are shown in table 1. The marketing or inspection agencies of other major exporters report only one measure of non-millable material. Therefore, many importers are not familiar with dockage, and they have some difficulty in knowing how to measure or interpret the

Table 1. Grading Factors for Wheat

		Maximum limits for:					

U.S.	Min.	Heat	Total	Shrunken,	Wheat of		
Grade	Test	Damaged:	Damaged:	Foreign	Broken	Total	Other
	Weight	Kernels:	Kernels:	Material:	Kernels	Defects:	Classes

	Pounds	-----Percent-----					
No. 1	60.0	0.2	2.0	0.5	3.0	3.0	3.0
No. 2	58.0	0.2	4.0	1.0	5.0	5.0	5.0
No. 3	56.0	0.5	7.0	2.0	8.0	8.0	10.0
No. 4	54.0	1.0	10.0	3.0	12.0	12.0	10.0
No. 5	51.0	3.0	15.0	5.0	20.0	20.0	10.0

Note: U.S. Sample Grade shall be wheat which does not meet the requirements for any of the grades No. 1 to No. 5 inclusive, or which contains harmful or toxic substances or has any commercially objectionable odor.

dockage content of imported wheat. Domestic millers, on the other hand, are quite comfortable with dockage as a measure. The grain that they purchase is not required to be graded so they assign discounts/premiums to factors to specify the quality they want. If adopted, the combined grading factor would primarily affect our export market.

Questions have been raised in the domestic wheat industry as to why a standards change would be proposed. Many industry sources view it as reducing the amount of information available on the official inspection certificate, rather than as an adjustment that would lead to an improvement in the quality of the wheat shipped. Such a modification would also be counter to changes being considered for corn and sorghum grading standards. For those grains, consideration is being given to separating such factors on the grading certificate.

The proposed change would permit more uniform export contracts, and encourage producers and exporters to seek ways to dispatch cleaner wheat, in order to maintain or even expand the U.S. market share. Currently, many U.S. wheat exporters face considerable skepticism about the continuing quality of the wheat they dispatch. The advantages of cleaner wheat are not well understood by U.S. wheat producers, handlers, and exporters, however.

Regardless of whether dockage plus FM would be a grading factor for wheat or treated as a deductible, the costs of such a change would be borne primarily by the producers and/or exporters. Nearly all importers clean the wheat they import to remove non-millable material prior to milling wheat into flour to remove the potential for damage to flour quality and milling equipment. Thus, they initially shoulder the cost of the lower quality wheat.

However, the costs are transmitted back to the producers and/or exporters through discounts in contracts. Under the proposed system, importers would still bear some costs since they would pay wheat prices for non-wheat material.

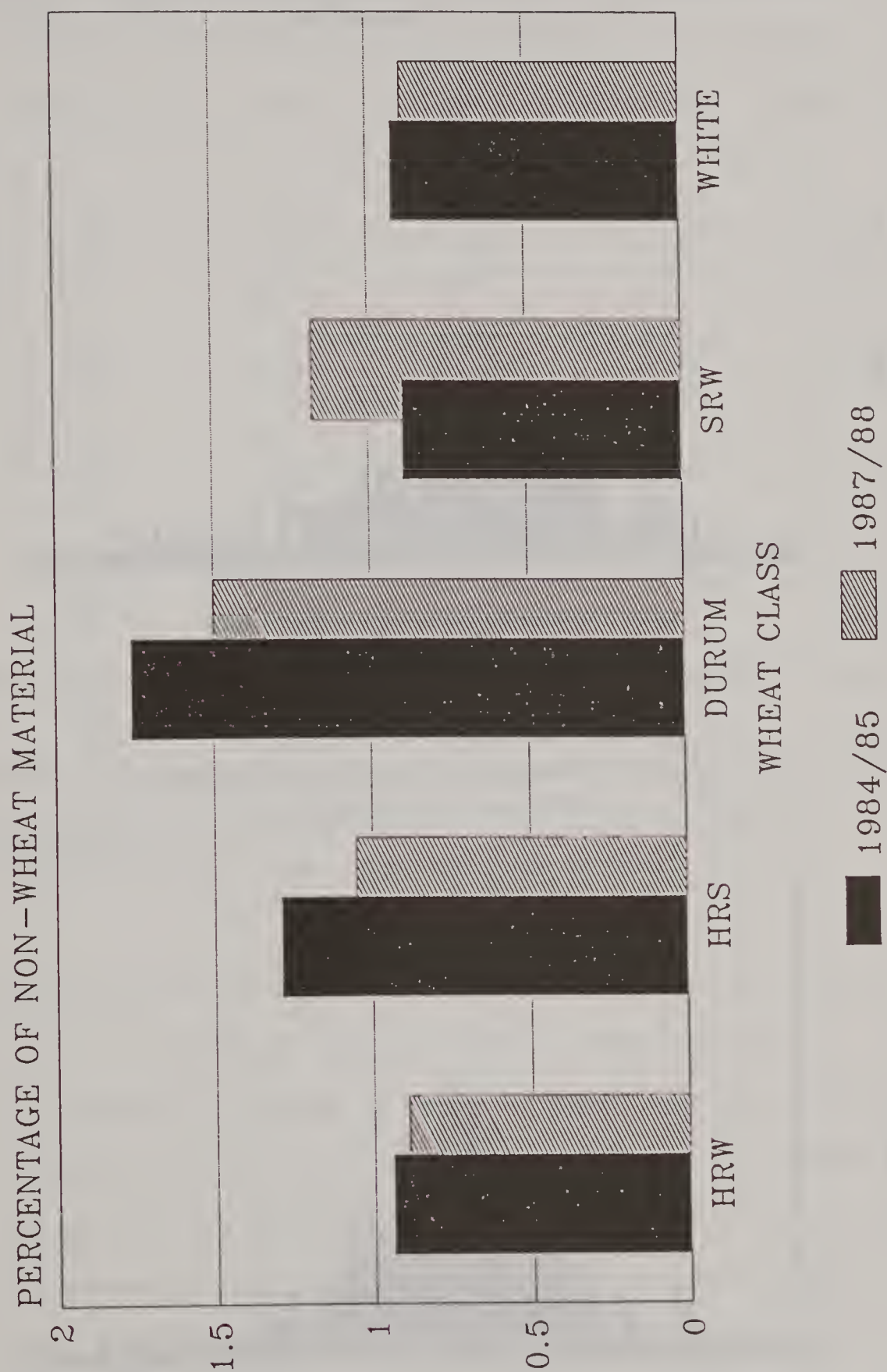
At present, dockage is measured by FGIS grain inspectors at U.S. export terminals and also in random samples of the new crop each year, but it is not treated as a grading factor. Dockage is reported on the Official Inspection Certificate, along with moisture content and protein content. Starting in May, 1987, dockage has been reported to the nearest tenth of a percent, rather than rounded down to the nearest half a percent as had been required previously. As with other non-grade factors, many importers specify permissible dockage levels in the contracts they negotiate with U.S. grain exporting firms. These importers include Taiwan, Japan, and the Philippines.

Quality of U.S. Wheat

Data for this study on dockage, foreign material, and other measures of quality and quantity for exported wheat were provided by FGIS (table 2). The data account for all wheat shipped from U.S. ports from 1984 through early December, 1988. The data indicate importing nation and class of wheat which permits the examination of the effects of the new grading factor by class and to a lesser extent, by importing region.

Most wheat currently exported at least meets the grading standards for Grade U.S. No. 2 (designated Grade No. 2 or better in the contracts). In general, exported wheat was as clean or cleaner in 1987/88 than it was in 1984, with the exception of soft red winter wheat (SRW), which had much higher average FM content after 1984 (figure 1).

FIGURE 1. U.S. EXPORT WHEAT QUALITY
BY CLASS, 1984/85 AND 1987/88



(SUM OF DKG AND FM, IN PERCENT)

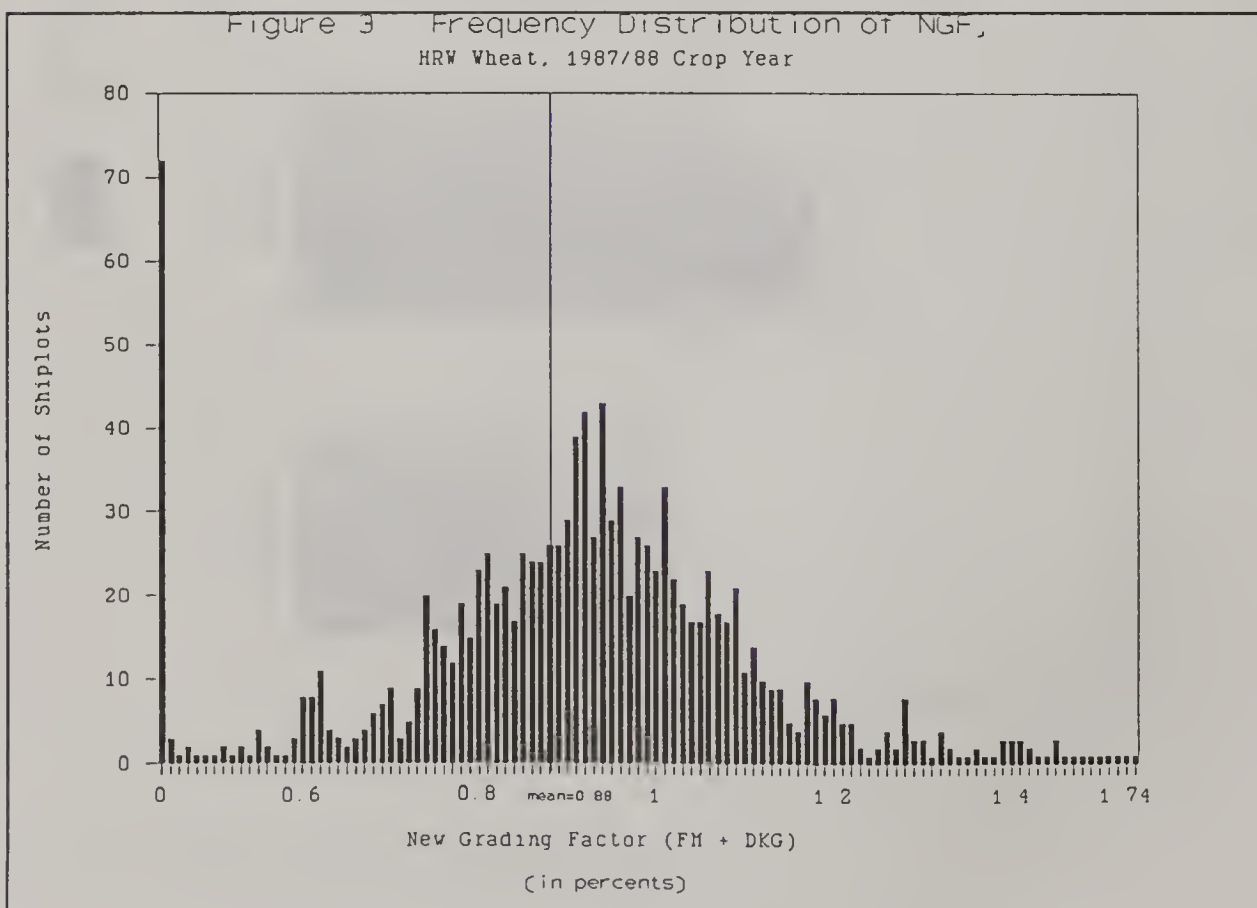
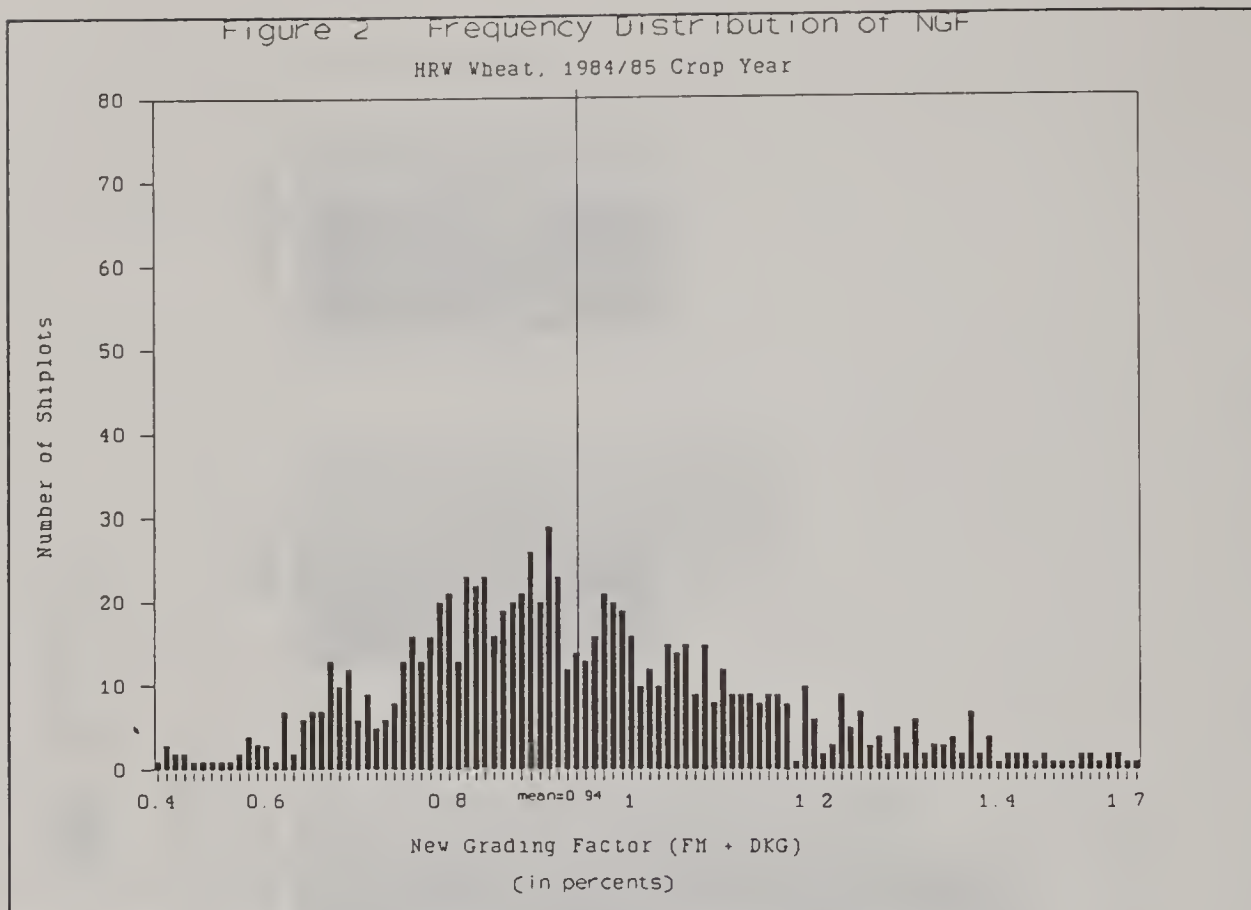


Table 2. Current Average Dockage Content (DKG) and Foreign Material Content (FM) for Export Classes of Wheat, 1984-88

Class of wheat	Measure	Percent			
		1984	1985-86	1987-88	1984-88
Hard Red Winter	FM	0.30	0.32	0.28	0.29
	DKG	0.64	0.65	0.61	0.62
	N ¹	906	837	1,862	3,605
Hard Red Spring	FM	0.40	0.23	0.24	0.31
	DKG	0.89	0.79	0.82	0.85
	N ¹	763	393	463	1,619
Durum	FM	0.68	0.61	0.45	0.57
	DKG	1.08	0.84	1.05	0.98
	N ¹	250	331	315	896
Soft Red Winter	FM	0.19	0.43	0.32	0.31
	DKG	0.70	0.88	0.87	0.85
	N ¹	340	794	1,141	2,275
White	FM	0.29	0.26	0.25	0.26
	DKG	0.63	0.69	0.64	0.65
	N ¹	434	491	839	1,754

NOTE: Figures for FM and dockage are averages for all shiplots in that period.

¹Number of shiplots of that wheat class sent out in that period.

The distribution of all HRW wheat shiplots dispatched in the 1984/85 and 1987/88 crop years are shown in figures 2 and 3. These frequency distributions confirm the evidence in Table 2, namely that more shiplots with lower FM and dockage content were sent out in 1987/88 than in 1984/85. The more than 70 shiplots with measured FM and dockage at zero percent suggest there may be a market for high quality U.S. wheat, though more study is required in this area. Similar diagrams for HRS wheat shipped in those years (figures 4 and 5) are consistent with those for HRW. While the shapes of the distributions are comparable between the two years, the 1987/88 graph shows

more shiplots to the left of the mean than does the 1984/85 graph, suggesting more shiplots with lower non-wheat material.

Hard red winter wheat has accounted for the majority of wheat of all classes exported by U.S. firms over the last few decades. Table 3 shows a comparison of average FM and dockage contents for eight major importing regions over the period 1984-88, as well as the volume and number of shiplots.

Among regions receiving at least 50 deliveries of U.S. hard red winter (HRW) wheat over that five-year period (calendar), the cleanest loads went to Central American countries and developed countries in Asia such as Japan and

Table 3. Foreign Material and Dockage for Exported HRW Wheat by Import Regions, 1984-88 (minimum of 50 shiplots)

Region	FM	DKG	Quantity	Shiplots
	Percent		Thou. metric tons	No.
C. AMER.	0.21	0.48	1,732	278
ASIA-DEV ¹	0.27	0.57	6,852	669
ASIA-LD ²	0.28	0.62	5,986	262
CPE's ³	0.30	0.66	14,441	417
MIDEAST	0.30	0.64	4,691	139
S. AMER.	0.32	0.69	4,701	364
AFRICA	0.32	0.68	8,106	517

¹Developed Asia (ASIA-DEV) includes Japan, South Korea, Taiwan, Hong Kong, and Singapore.

²Developing Asia (ASIA-LD) includes lower income Asian countries, such as India, Laos, Pakistan, etc.

³CPE's defined as centrally planned economies such as China, the USSR, East Germany, Poland, etc.

Figure 4 Frequency Distribution of NGF,
HRS Wheat, 1984/85 Crop Year

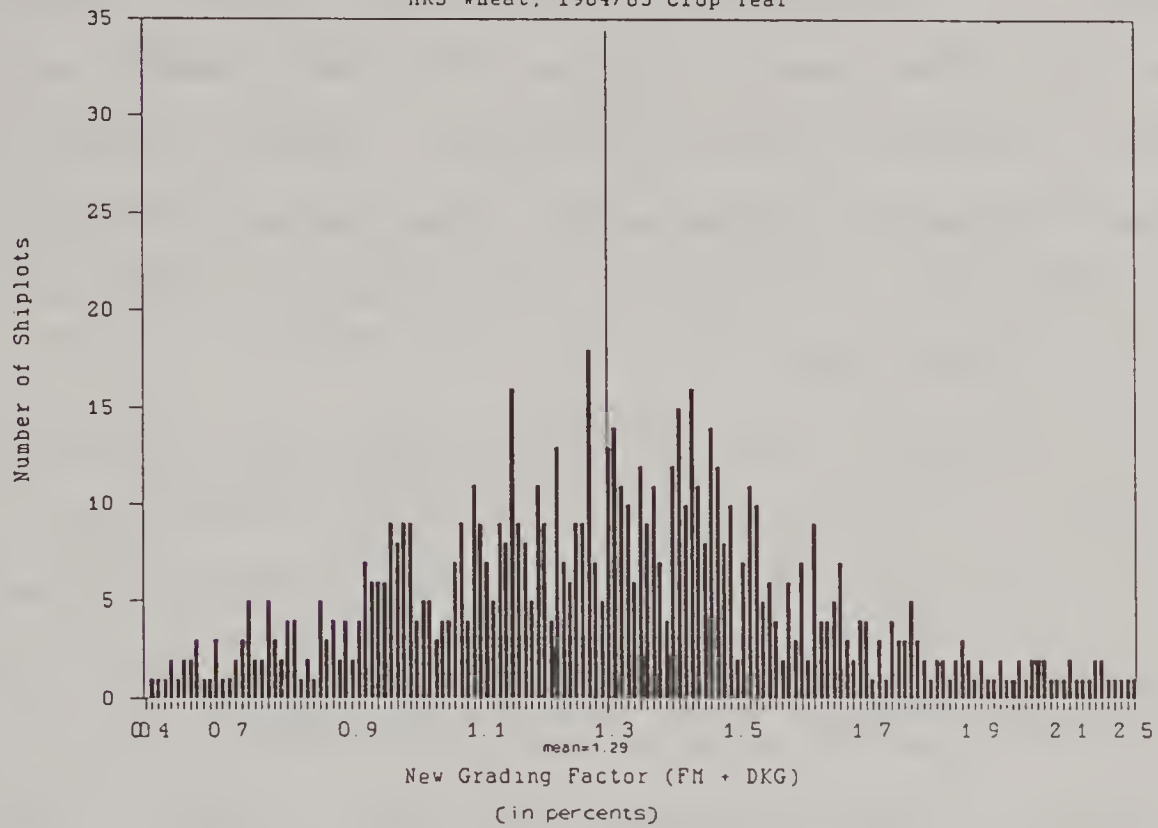
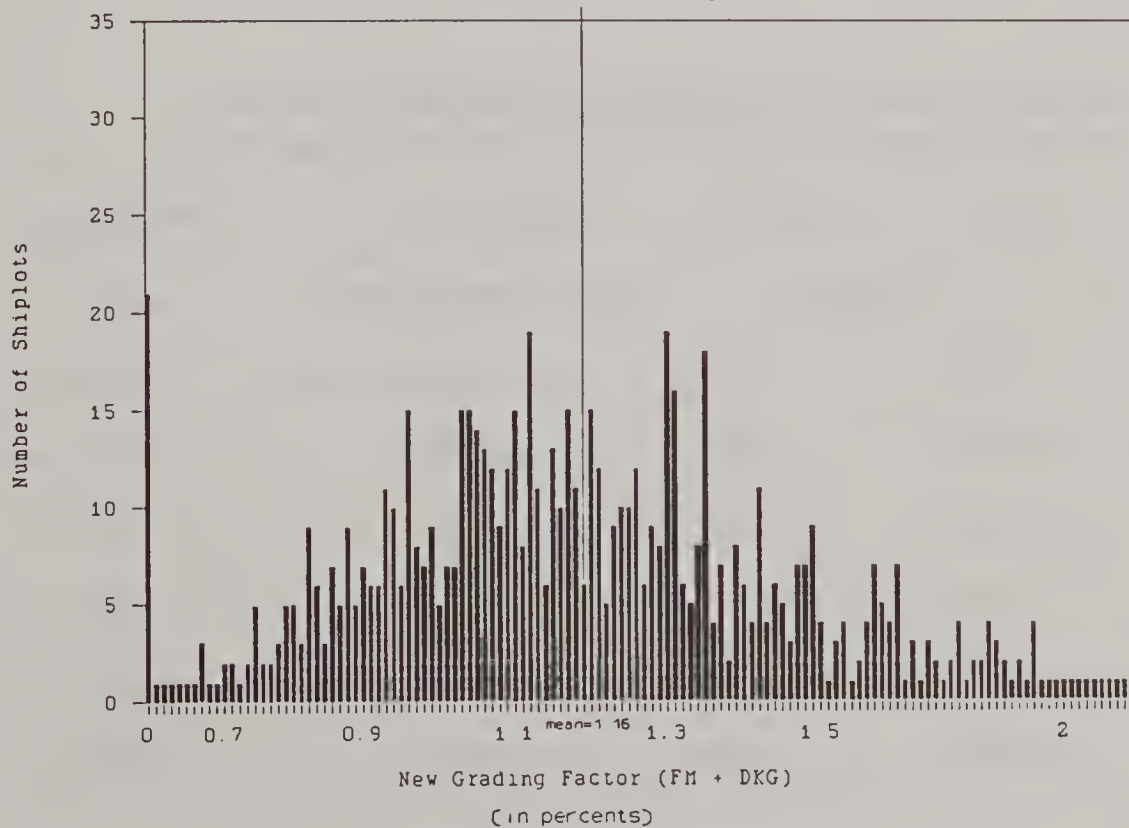


Figure 5. Frequency Distribution of NGF,
HRS Wheat, 1987/88 Crop Year



South Korea. It is widely believed that some Asian countries prefer to purchase cleaner wheat, even at a premium. Price data, however, were not available to confirm or refute this hypothesis. Shipments to South America and Africa contained more dockage and FM. These regions contain the poorest countries of the world and are also the areas receiving most of the concessional (PL-480) wheat.

Exports of hard red spring (HRS) wheat showed similar patterns in recent years (table 4). The wheat with the lowest average FM was shipped to the Middle East. Consignments to developing Asia had relatively high FM content, but low dockage. Shiplots of HRS wheat sent to South and Central America and Africa had the highest percentage of non-millable material (FM and dockage). The contradictory results between HRW and HRS wheat for Central America may depend on the end-use of the different classes of wheat.

Table 4. Foreign Material and Dockage for Exported HRS Wheat
by Import Regions, 1984-88 (minimum of 50 shiplots)

Region	FM	DKG	Quantity	Shiplots
	Percent		Thou. metric tons	No.
ASIA-DEV ¹	0.28	0.81	5,496	694
ASIA-LD ¹	0.29	0.84	3,073	247
AFRICA	0.34	0.70	1,205	103
S. AMER.	0.36	0.95	1,529	202
C. AMER.	0.38	1.02	2,348	305
EUROPE	0.38	0.93	2,254	285

¹See table 3.

Overall, wheat exported from the United States has become cleaner during the last five years (in terms of both dockage and FM); however, U.S. wheat still contains considerably more non-millable material than the wheat shipped by our chief competitors for which data are available. Wheat exported from Canada is similar to our HRS class, and it contained 0.15 percent FM on average in 1987/88 and an average dockage content of about 0.18 percent. This compares to an average FM content of 0.24 percent for U.S. HRS wheat for the same year, and an average dockage content of 0.8 percent. In comparison, Australian hard winter wheat exported in 1987/88 contained an average of 0.05 percent FM and the average dockage content was 0.4 percent. The comparable figures for U.S. HRW wheat in the same year were 0.28 percent for FM and 0.61 percent for dockage. Even with improvements in wheat cleanliness in recent years, the U.S. still trails some of its competitors. Dockage and FM content for Argentina and the EC are not known.

Costs of the Alternatives

In this report, we refer to the sum of FM and dockage as the new grading factor (DKGFM). It is the factor that would be used if one of the proposals were adopted in the U.S. Grading Standards for wheat. The breakdown of average DKGFM by class and percentage of wheat by class that would no longer be graded U.S. No. 2 for export are shown in table 5. To compare between classes under the new grading factor, half or more of the shiplots of the HRS, HRW, and white classes would still grade U.S. No. 2 or better (50, 65, and 69 percent respectively). On the other hand, at least 70 percent of SRW and Durum classes would have been downgraded to U.S. No. 3 or lower.

Table 5. Average DKGFM for Export Wheat by Class, 1984-88

Class	Measure	1984	1985/86	1987/88	1984/88
Percent					
Hard Red Winter	DKGFM	0.94	0.97	0.89	0.91
	Regraded ¹	35	44	31	35
Hard Red Spring	DKGFM	1.29	1.03	1.05	1.16
	Regraded ¹	75	48	52	50
Durum	DKGFM	1.76	1.45	1.50	1.55
	Regraded ¹	95	80	90	86
Soft Red Winter	DKGFM	0.89	1.22	1.18	1.16
	Regraded ¹	25	72	73	68
White	DKGFM	0.92	0.95	0.89	0.91
	Regraded ¹	39	40	30	31

¹Percent of shipments that would not have met grade No. 2 requirements for DKGFM under new grading standards.

DKGFM as a Grading Factor

Both the costs of making DKGFM a grading factor and the costs of making DKGFM a deductible factor were analyzed in this study. For the first alternative, wheat that has an DKGFM exceeding the current FM limit of 1.0 percent for grade U.S. No. 2 will be regraded. For each shiplot the cost of the change was estimated as the difference in prices between the respective grades. This portion of the study used price data for lower grades (No. 3 and No. 4) of wheat for all major classes. The representative price differentials now prevailing in the market during the winter of 1989 were obtained from representative major grain trading firms (table 6).

If such a grading standard change were made the existing price differential structure would likely narrow because large volumes of wheat would be affected and because purchasers would take into account that the

Table 6. Price Differentials between U.S. No. 2
and U.S. No.3 Grade Wheat, All Classes

Class	Price Differential

	Dollars
Hard Red Winter	0.02 per bushel
Hard Red Spring	0.04 per bushel
Durum	0.06 per bushel
Soft Red Winter	0.03 per bushel
White	0.03 per bushel

Source: Telephone survey of nine major grain trading firms
in Gulf, Great Lakes, and Pacific regions in
February, 1989.

inherent quality of the wheat was not altered by the change in standards. Price differentials tend to increase when more grain of low quality appears on the market. The costs of altering the grading standards to include total dockage and FM as one grading standard given the price differentials are shown in table 7.

The costs of undertaking such a standard change would have increased by more than 6 percent between the 1984/85 and the 1987/88 crop years. The costs to producers of the two major export wheat classes, HRW and HRS, both increased, entirely due to larger export volume in 1987/88 than in 1984/85. Of course, the price differentials during the 1984/85 crop year may have been somewhat higher than those now, because the FM and dockage were higher, so estimated costs for 1984/85 may be biased downward.

When sensitivity analysis was conducted for the combined grading standard, a different result emerged. The current grading standard for FM of 1.0 percent was relaxed for the new combined standard of DKGFM by increments

Table 7. Costs of a Combined Dockage and Foreign Material as a Grading Factor for All Classes of Export Wheat

Class	1984/85		1987/88	
	Cost ¹	Volume ²	Cost ¹	Volume ²
	Mil. dol.	Mil. bu.	Mil. dol.	Mil. bu.
Hard Red Winter	4.46	223	5.27	263
Hard Red Spring	6.87	171	7.79	194
Durum	4.42	73	3.59	60
Soft Red Winter	1.35	44	1.96	65
White	2.85	95	1.32	44
All	18.71	606	19.93	626

¹Defined as the value lost due to shiplot being regraded as No. 3 for export.

²Volume of shiplots affected by regrading.

of 0.25 of a percentage point (table 8).² The costs for the 1984/85 crop year are consistently higher at each level than for the 1987/88 crop year, despite the fact that costs are higher at the original level (of 1.0 percent) for 1987/88. This indicates that for all classes a great deal more wheat was shipped in 1987/88 than in 1984/85 with a DKGFM total that fell between 1.0 and 1.25 percent. The costs to producers and exporters of combining the two factors fell 59 percent by relaxing the standard by one quarter percent for 1987/88, while it fell only 44 percent for the same increment for the 1984/85 crop year. For both years, the costs dropped just over 50 percent by loosening the standard from 1.25 to 1.50 percent.

² It is important to note, however, that none of these grading standards changes have been explicitly proposed by FGIS.

Table 8. Cost Results of Sensitivity Analysis for Relaxing Wheat Grading Standard, 1984/85 and 1987/88

Standard for DKGFM	Marketing Year	
	1984/85	1987/88
	Million dollars	
1.00 percent ¹	18.71	19.93
1.25 percent	10.52	8.11
1.50 percent	4.95	3.72
1.75 percent	2.80	1.73
2.00 percent	1.78	0.88

¹Original limit for grading wheat Class No. 2 on the basis of foreign material.

For both crop years, a large portion of the cost of adopting the proposed standards would fall on durum producers, particularly at the higher tolerance levels. At the 1.25 percent level, more than 30 percent of the costs would be assessed to durum shiplots (and more than 40 percent on HRS shiplots), while at the 2.00 percent cutoff point, around 90 percent of costs would accrue to durum producers. Practically no SRW and HRW wheat and little white wheat would be penalized in either year for a DKGFM greater than 1.50 percent.

DKGFM as a Discount Factor

Costs for combining dockage and foreign material as a discount factor were estimated in two different ways: (1) discounting a lot when the amount of measured DKGFM surpasses 1.0 percent by weight, and (2) using current discount schedules for FM assessed by grain trading companies at export terminals for wheat. The discount method used current discount

schedules for FM being assessed by typical grain trading companies at export terminals for wheat.

Market Discounts

Discounts in use during the Fall of 1988 were obtained from the Kansas City Commodity Office (KCCO) of the Agricultural Stabilization and Conservation Service (ASCS). The most common discount schedules provided by representative grain trading firms were used in this analysis to evaluate the costs of discounting with the new grading factor (table 9).

Estimates of the costs of the standards modification were accomplished using the above discount arrangement for 1984/85 and 1987/88 crop years, table 10. Adjustments were made to account for discounts that would have

Table 9. Foreign Material Discount Schedule for Wheat

Class	Discount ¹	Cutoff ²
Hard Red Winter	\$0.01 each 0.5 percent or fraction	0.5 percent
Hard Red Spring	\$0.01 each 0.5 percent or fraction	0.5 percent
Durum	\$0.03 each 0.5 percent or fraction	0.5 percent
Soft Red Winter	\$0.01 each 0.5 percent or fraction	1.0 percent
White	\$0.02 flat rate	1.0 percent

Note: Cutoff levels for HRW, HRW, and durum wheat are below the grade limit.

¹Discounts in dollars per bushel.

²FM below this percentage is a permissible level.

Source: Typical standards used by grain trading companies in Fall of 1988.

FIGURE 2A. RELATIVE DISCOUNT BY CLASS
(All Classes)

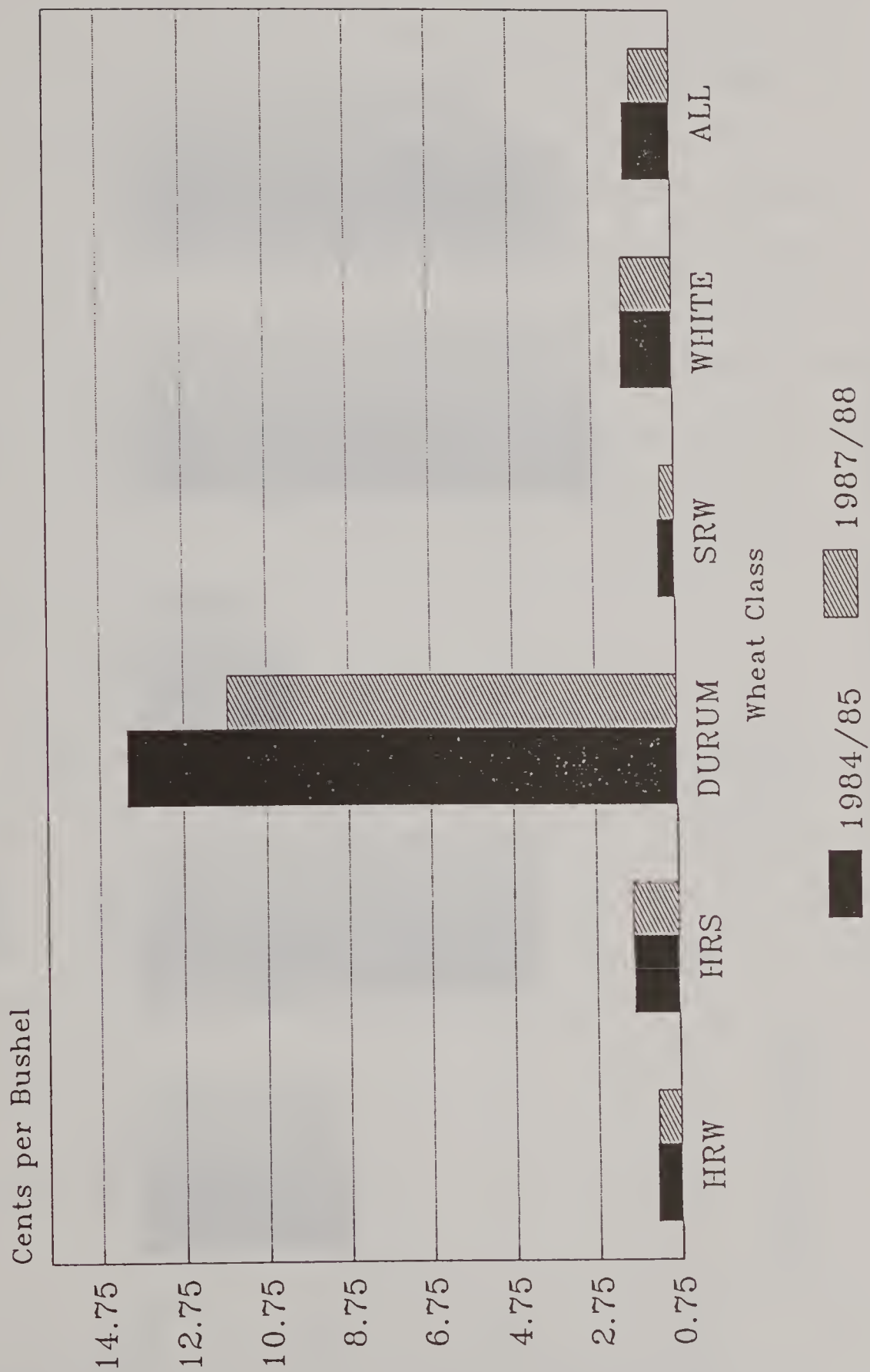
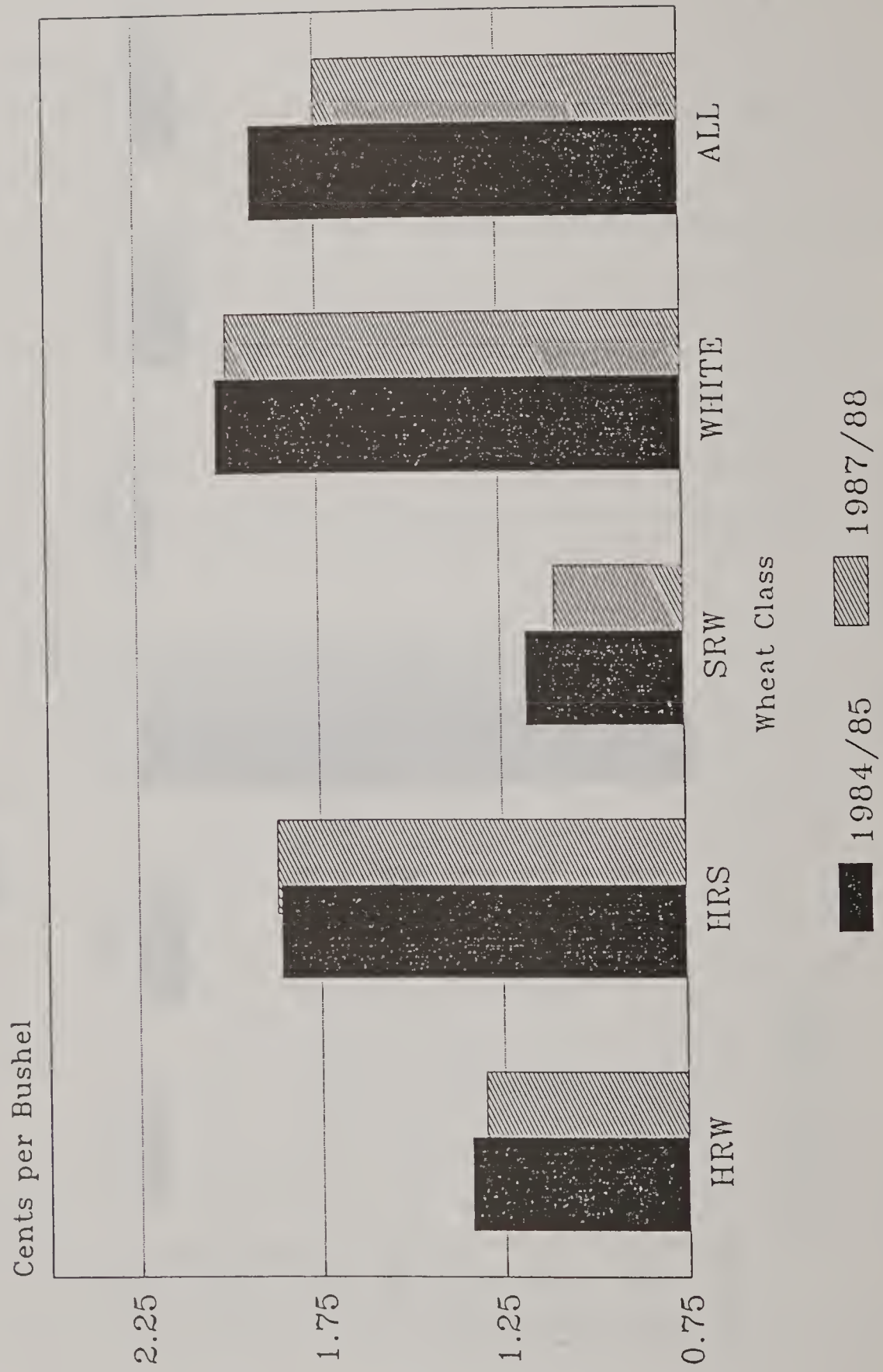


FIGURE 2B. RELATIVE DISCOUNT BY CLASS
(All Classes except Durum)



been made on wheat shipped at the current discount schedule for FM alone (figure 6a and 6b). The corrections were minor for all classes of wheat except durum, which at a cutoff level of 0.5 percent for FM would have faced considerable average discounts in both years.

The overall cost of changing the current standard to the proposed standard would have cost producers and exporters approximately \$20 to \$22 million in the study years. The volume of wheat exported from the United States that would have been discounted increased between 1984 and 1987. Of course, it must be remembered that overall wheat exports increased between 1984/85 and 1987/88. The cost of the proposed standard increased proportionally less than did the volume of exports between 1984/85 and 1987/88 (6.8 to 11.8 percent).

Table 10. Relative Costs of Applying Current Market Discounts for FM to New Standards for U.S. Export Wheat, 1984/85 and 1987/88

Class	1984/85		1987/88	
	Cost ¹	Volume	Cost ¹	Volume
	Mil. dol.	Mil. bu.	Mil. dol.	Mil. bu.
Hard Red Winter	9.29	693	11.34	871
Hard Red Spring	3.89	209	4.75	253
Durum	5.21	37	4.57	39
Soft Red Winter	0.52	44	0.72	65
White	1.93	95	0.88	44
All	20.85	1,079	22.27	1,271

¹Relative to discounts that would have been charged using this schedule for all export shiplots in those years for foreign material only.

The class of wheat that would have been hit most heavily in terms of total costs is HRW wheat, both because it is the dominant class of wheat exported from the United States and because the discount toleration point is lower (0.5 percent) than the grade limit for that class of wheat. The second most heavily influenced class would have been durum wheat in 1984/85. Durum would be relatively more affected because the discounting costs of between \$4 and \$5 million (about half that of the class HRW) would have occurred on total shiplots of less than 40 million bushels (as opposed to shiplots of 700-900 million bushels for the class HRW). The total discount that would have been assessed on durum in 1984/85 was somewhat higher than for 1987/88 despite the lower volume affected because the earlier crop year had more shiplots with a higher dockage content. During the two years examined, the percentage of wheat that would have been discounted was fairly constant for the classes HRW and HRS, but fluctuated for the other classes. For both SRW and durum wheat, the percentage of wheat that would experience deductions increased substantially between 1984/85 and 1987/88, while for white wheat, the discounted shiplots would have declined in number. Nearly all shiplots of HRW, HRS, and durum would have been affected by discounts in these years, while less than half of the shiplots of SRW and white wheat would have been assessed a discount.

Weight Discounts--If the costs of adopting the proposed standards are estimated by discounting by weight rather than using current market discount schedules, somewhat different results appear. For the analysis of discounting by weight, all FM and dockage material above 1.0 percent was deducted from the total weight of the shiplot delivered, while DKGFM under that level was not penalized. For example, a shiplot of 20,000 metric tons

with DKGFM at 1.5 percent would have a deduction totalling 100 metric tons. The total weight deducted over all shiplots by class was valued at the prevailing export market price for each class of U.S. No. 2 wheat. These cost estimates are shown in table 11. The costs are substantially lower than those presented in table 10 which were incurred when the market discount schedules were used. The costs would clearly increase if the amount charged for transporting the excess FM and dockage were also included.

The amount of weight that would have been deducted from shiplots was calculated for each class in both the 1984/85 and 1987/88 crop years, and valued at export prices that prevailed in June of 1988. All shiplots with DKGFM exceeding 1.0 percent would have value deducted for the amount of FM and dockage over the 1.0 percent cutoff. Certain companies purchasing

Table 11. Costs of Discounting by Weight for New Grading Standards for Classes of Export Wheat, 1984/85 and 1987/88

Class	1984/85		1987/88	
	Cost ¹	Volume ²	Cost ¹	Volume ²
	Mil. dol.	Thou. bu.	Mil. dol.	Thou. bu.
Hard Red Winter	1.30	360	0.95	280
Hard Red Spring	2.72	638	1.84	561
Durum	2.96	625	1.89	432
Soft Red Winter	0.35	108	0.49	152
White	0.80	210	0.21	61
All Classes	10.86	1,943	5.39	1,488

¹Valued at prevailing No. 2 export prices for each class in each year.

²Total bushels of FM and dockage that would have been deducted from all shiplots.

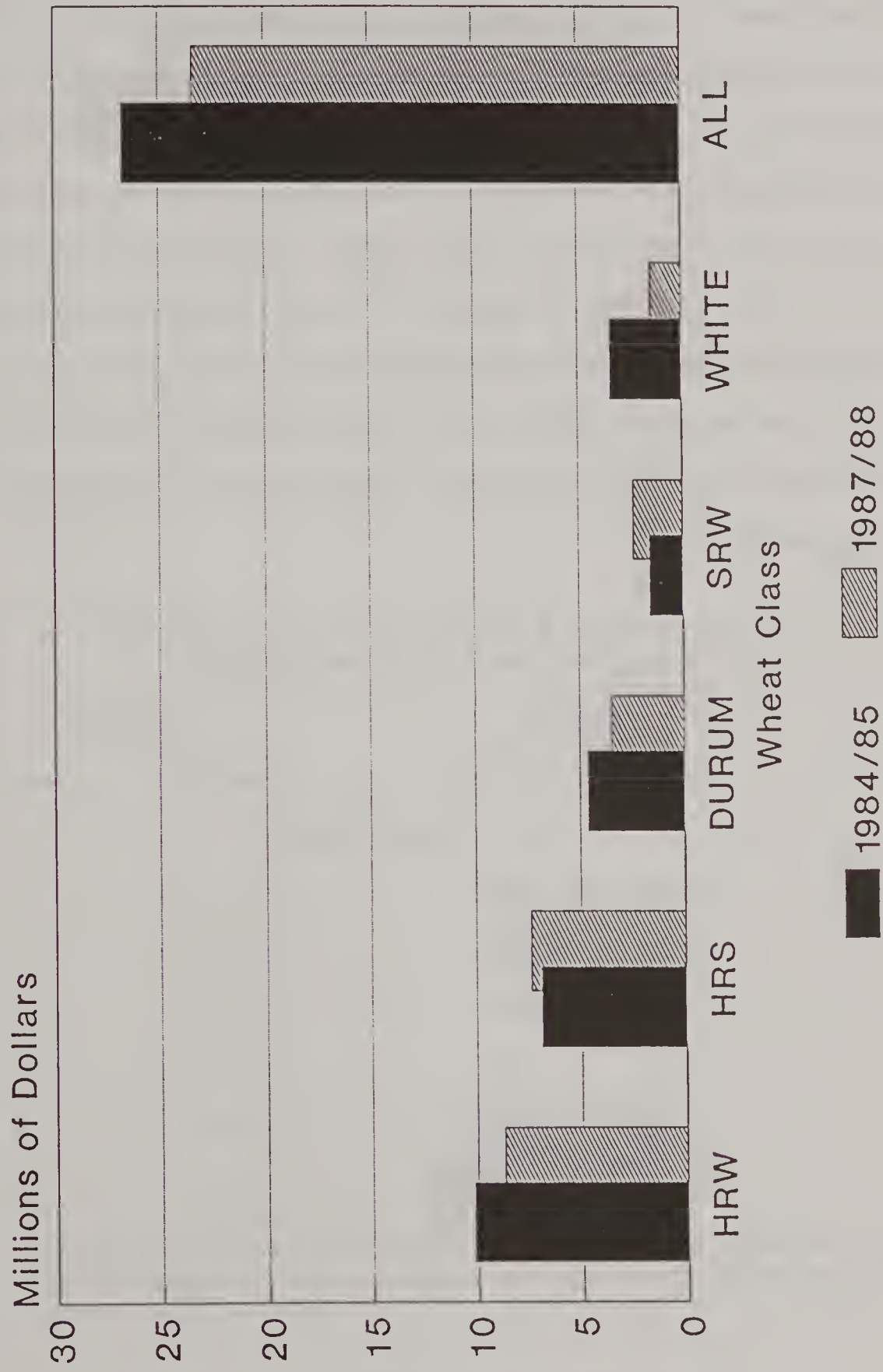
particular classes of wheat (namely durum and HRS) also assess an additional per bushel discount for dockage above 1.9 percent on shiplots received. To the extent that companies currently engaged in this double penalization of dockage continue the practice under the new system, the costs discussed below would be understated.

The cost of adhering to the proposed standard, if discounts were to be assessed by weight, would have been 51 percent higher in 1984/85 than in 1987/88 at current prices. If the volume that would have been discounted in 1984/85 were to be valued at the same constant (1987/88) prices, the difference would have been less, only 24 percent higher. Over all classes, the value of the deducted material at 1987/88 crop year prices would have been just over \$7 million (see table 12, Case A), due to higher market prices prevailing in 1984/85 than in 1987/88. The volume of discounted material decreases for every class except SRW wheat between 1984/85 and 1987/88, particularly for durum and white wheats.

Alleviation of Costs

Producers could attempt to alleviate some of the cost burden discussed above by cleaning their wheat to remove excessive dockage. In fact, the new grade factor would create an incentive to do so, especially if the standards are not relaxed under the proposal. Cleaning is assumed to cost farmers three cents a bushel for wheat with a DKGFM above 1.0 percent. Acquisition costs of the cleaning equipment are not considered, since such data are not readily available. If the foreign material and dockage material removed by the cleaning process has no economic value, (Case A) then the material removed above 1.0 percent (the No. 2 standard) would cost farmers the value of the weight removed (table 12 and figure 7). If the

FIGURE 3. CLEANING COSTS BY CLASS,
WITHOUT RESALE



material removed has value as a livestock feed ingredient, then the loss to farmers or elevator operators would be diminished, but only by a small amount. This second scenario (Case B) assumes that the screenings are sold to local feed mills, and that the screenings have a value at half the prevailing market price for millrun. The millrun price was about \$100 per metric ton or \$2.70 per bushel in late 1988. The gain per bushel from selling the screenings was estimated at \$1.35 per bushel of screenings for both 1984/85 and 1987/88. Transportation costs that would have been incurred if the dockage material had not been removed at the country elevator level will also be saved at a rate of 50 cents per bushel of screenings removed.

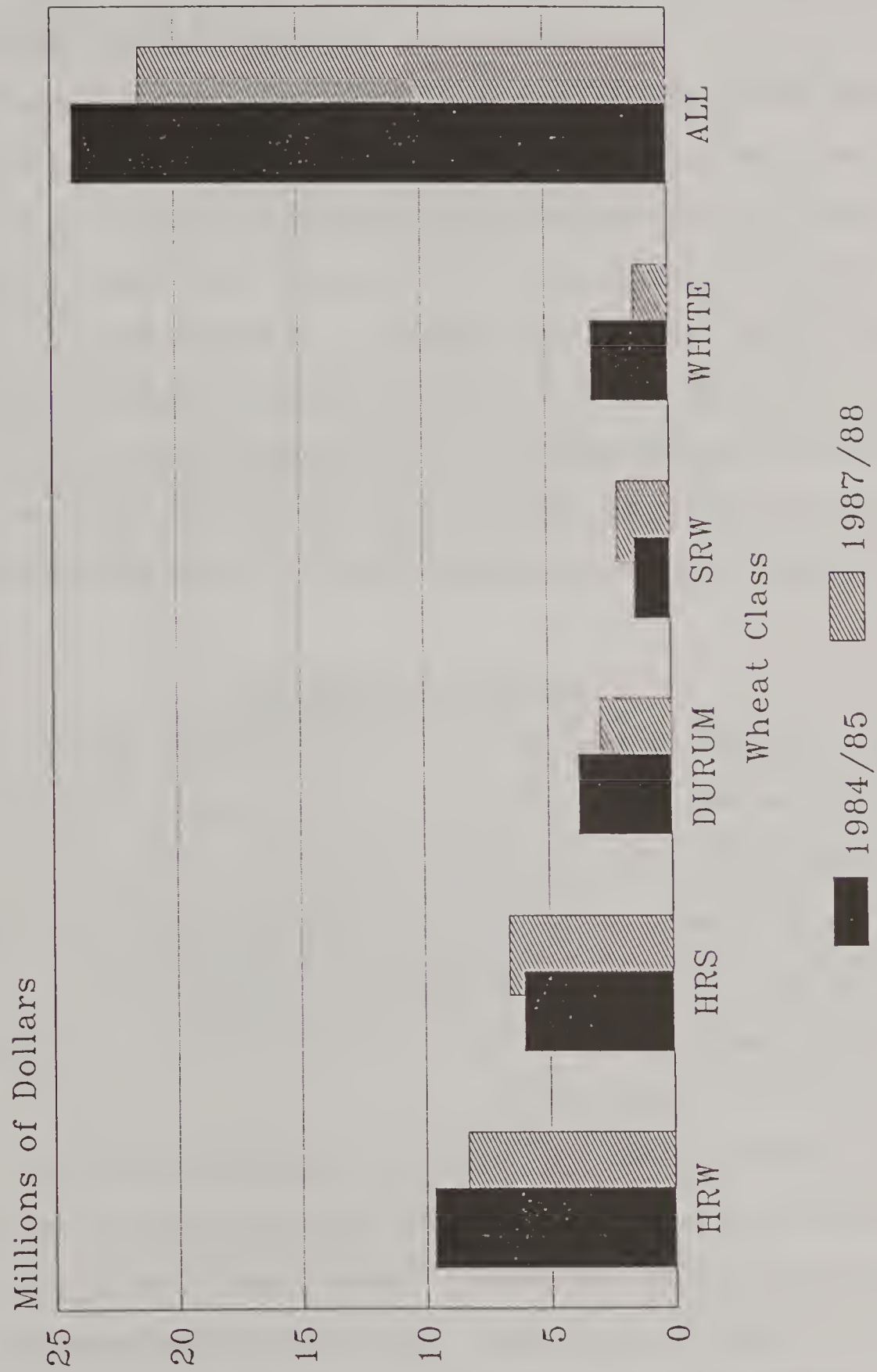
Table 12. Costs of Standard Modification of Wheat when Wheat is Cleaned at the County Elevator, 1984/5 and 1987/88

Class	1984/85		1987/88	
	Case A ¹	Case B ²	Case A ¹	Case B ²
Million dollars				
HRW	10.17	9.69	8.70	8.33
HRS	6.90	6.05	7.38	6.64
Durum	4.62	3.79	3.47	2.90
SRW	1.61	1.47	2.37	2.17
White	3.45	3.17	1.50	1.41
All	26.75	24.17	23.42	21.45

¹Scenario in which no value is attributed to screenings removed.

²Scenario in which screenings are valued at half the price of millrun from flour mills.

FIGURE 4. CLEANING COSTS BY CLASS,
WITH RESALE



The costs of altering the grading standards when farmers choose to clean the wheat at the country elevator are greater for the 1984/85 crop year than for the 1987/88 crop year. These costs are comparable to those reflected by other methods of calculation. The cost increases by around ten percent for both years when the screenings are not used in byproduct feeds. The costs to producers of each class of wheat except HRS and SRW declined between 1984 and 1987 (figure 8). If farmers chose to remove all dockage and foreign material, instead of meeting the grade standards, both the costs (in terms of cleaning and of lost market weight) and the benefits (in terms of premiums for higher quality wheat and transportation savings) would be greater, but we have not estimated the net benefit or cost.

Summary and Conclusions

By all the methods examined so far, the alternative grading standard which would include dockage and FM as a single grading factor would impose costs ranging from \$5.5 to \$27 million (figure 9). The costs as determined in the analysis depend on the year and the method utilized, and whether the factor was made a grade determining factor or simply treated as a discount or a weight deductible. The costs constitute between 0.1 to 0.6 percent of total value of U.S. wheat exports.

It is likely that most of the discounting practices and price differentials currently observed in the marketplace would be adjusted to reflect the new grading environment. Further, many of these costs could possibly be passed on to end-users. Under most of these scenarios, the blending practice that is common in the industry would continue. These costs imply no inherent improvement in wheat quality, unless cleaning

Table 13. Costs of Combining Dockage and Foreign Material as a Grading Standard for Wheat

METHOD	1984/85	1987/88
Million dollars		
Grading ¹	18.71	19.93
Discount ²	20.85	22.27
Deduct by weight ³	10.86	5.39
Clean without resale	26.75	23.42
Clean with resale ⁴	24.17	21.45

¹Valued at 1989 price differentials.

²Valued at 1987/88 crop year prices for each wheat class.

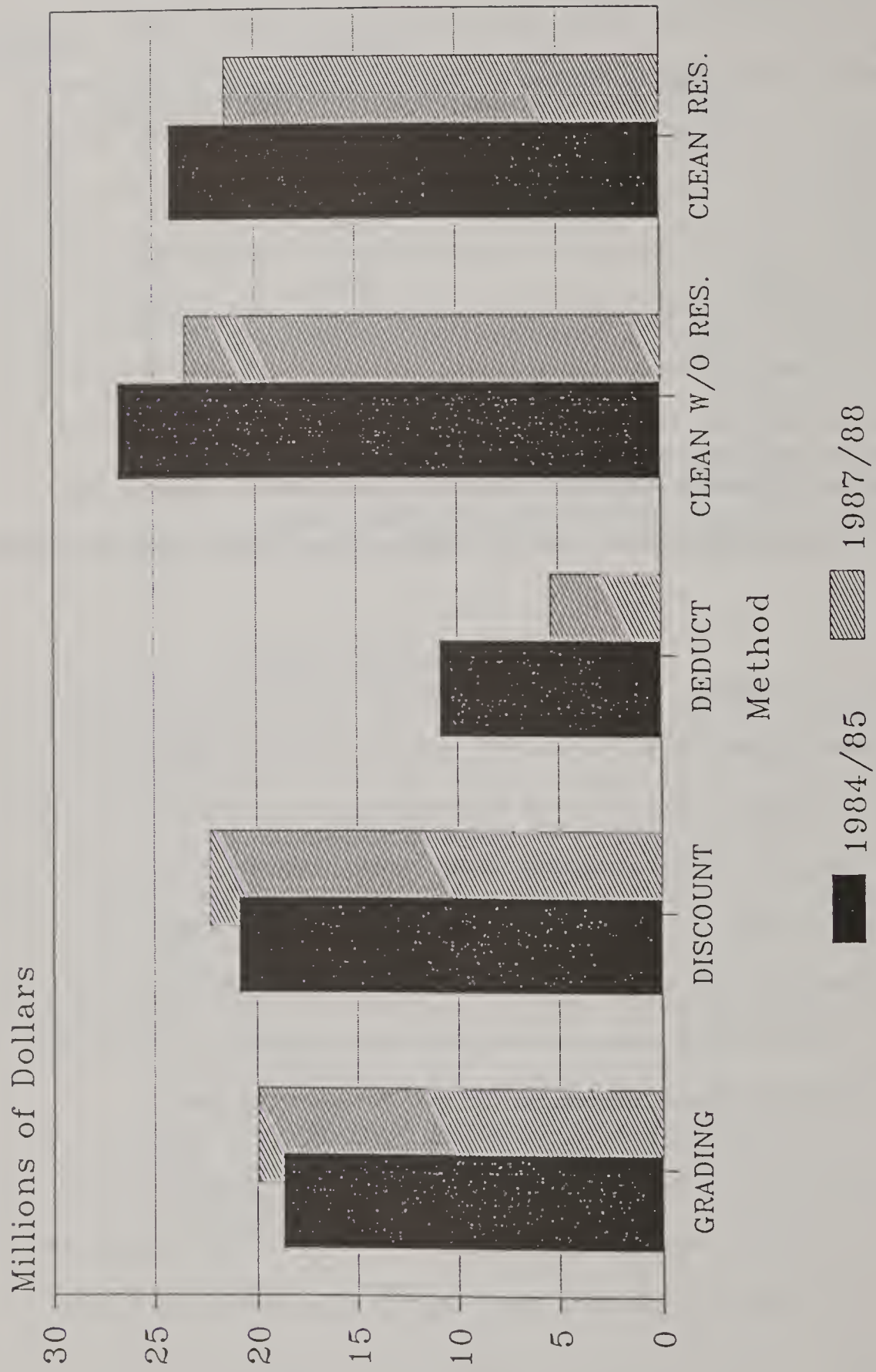
³Valued at crop year prices for each wheat class.

⁴Screenings valued at one half of 1989 millrun prices (\$1.33 a bushel).

becomes more common. Another alternative would be to undertake an effort to educate importers as to the distinction between dockage and foreign material in wheat, rather than eliminating the distinction altogether.

If the aim of the proposed change is to improve wheat quality, then there may be more direct ways of going about that task, such as making *both* dockage and foreign material grading factors, rather than combining the two factors. The factor limit for FM could be lowered to 0.5 percent, a level that usually triggers discounts in the domestic market.

FIGURE 5. ECONOMIC COSTS OF NEW STANDARD
1984/85 and 1987/88



2

